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U.S. Department of Agriculture

1967 BUDGET

EXPLANATORY NOTES

FOREST SERVICE

PREFACE

Project Statements

The obligations shown in the project statements are on the basis of the appropriations and activities proposed in the 1967 Budget Estimates. In some project statements, the activities are further divided into sub-categories, reflecting a more detailed description of the work conducted under the appropriation items.

Obligations reflected as subcategories in the project statements, while generally obtained from accounting records, in some instances represent the best approximation available. Wherever it has been necessary to distribute costs to activities for which total amounts cannot be taken directly from the accounts, every effort has been made to allocate such charges as accurately as possible based on other available information such as past experience, special studies, cost analyses, etc.

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FOREST SERVICE

Purpose Statement

The Forest Service was established February 1, 1905, pursuant to the Transfer Act of February 1, 1905, which provided for the transfer of the forest reserves from the Department of the Interior to the Department of Agriculture. Forest Reserves and the Bureau of Forestry were established by other acts prior to the Transfer Act. By the Act of March 4, 1907, the name "Forest Reserves" was changed to "National Forests" and the latter name has been used since that time.

The Forest Service is responsible for promoting the conservation and wise use of the country's forest and related watershed lands, which comprise one-third of the total land area of the United States. To meet its responsibility the Forest Service engages in three main lines of work, as follows:

1. Management, protection, and development of the National Forests and National Grasslands. The 186 million acres of National Forests and National Grasslands are managed under multiple use and for sustained yield. Under these principles natural resources of outdoor recreation, range, timber, watershed, and wildlife are utilized in a planned combination that will best meet the needs of the Nation without impairing the productivity of the land. These management and utilization principles were recognized in the Multiple Use-Sustained Yield Act of June 12, 1960 (74 Stat. 215).

In managing the National Forests, technical forestry is applied to the growing and harvesting of timber crops. Grazing use is managed to obtain proper range conservation along with utilization of the annual growth of forage. Watersheds are managed to regulate stream flow, prevent floods, and provide water for power, irrigation, navigation, and municipalities. Management includes the handling of 144 million visits of people to the National Forests for recreation purposes. Wildlife habitat is managed to provide a suitable land and water environment for both game and non-game wildlife.

Under the multiple use principles most areas are used for, or serve, more than one purpose or objective. For example, about 50% of the area within the National Forests serves five different purposes: (1) timber production, (2) watershed protection, (3) forage production, (4) wildlife production, and (5) recreation. An additional 28% serves four purposes in varying combinations. Of the remainder, 21% of the total serves three purposes with only 1% of the total reserved exclusively for a single purpose, mainly campgrounds and special use areas, such as summer homesites, pastures, corrals, etc. The varied interests which frequently conflict and which must be reconciled, and the vast areas covered, clearly require careful planning and skillful management of the National Forest properties.

Gross area within unit boundaries encompasses about 226 million acres in 44 States and Puerto Rico, of which some 186 million acres are under Forest Service administration. Protection from fire and trespass is made difficult by the large area to be protected, the general inaccessibility, many thousands of miles of exterior boundary, the intermingled public and

private land, the impossibility of taking preventive action with such a problem as lightning-caused fires, and the rapidly increasing public utilization of these lands and their associated resources.

The protection of the National Forests includes the control of forest fires, the control of tree disease and insect epidemics, and the prevention of trespass.

The major development activities of the National Forests are reforestation; timber stand improvement; revegetation; construction of roads, recreational facilities, range and other necessary improvements; and land acquisition and exchanges.

The economic importance of the National Forests and National Grasslands is evident when it is considered that:

- a. They produced a cash income in the fiscal year 1965 of over \$149.2 million. The following table summarizes cash receipts:

<u>Class of receipts</u>	1964 <u>Actual</u>	1965 <u>Actual</u>	1966 <u>Estimated</u>	1967 <u>Estimated</u>
Timber sales	\$127,959,538	\$138,768,926	\$143,100,000	\$146,400,000
Grazing and power..	3,181,940	3,126,997	3,200,000	3,200,000
Land uses	4,580,180	5,514,911	6,700,000	7,525,000
National grasslands	1,792,840	1,828,606	1,850,000	1,850,000
Total receipts ...	137,514,498	149,239,440	154,850,000	158,975,000
Above amounts include:				
Suspense account, Alaska a/	(915,812)	(839,406)	(850,000)	(850,000)
Suspense account, O&C Lands b/	(4,154,700)	(5,210,925)	(5,500,000)	(5,500,000)

Approximately 65% of this amount is credited to the general fund in the Federal Treasury (miscellaneous receipts). The remainder is distributed in accordance with special acts of Congress, including 25% to the States or counties in which lands are located, and 10% made available for construction and maintenance of the Forest Service system of roads and trails. In addition to these cash receipts, there are the even greater economic values which result from the processing of end products derived from this utilization of National Forest timber, forage, minerals, etc. There are also the important values of water, recreation, and wildlife which cannot be readily expressed in monetary terms.

a/ Account established pending settlement of Indian rights on Tongass National Forest, Alaska.

b/ Account established for Oregon and California railroad grant lands, for which receipts are transferred to Department of the Interior for distribution under the Acts of August 28, 1937, June 24, 1954, and August 3, 1961 (43 U.S.C. 1181f-g).

b. The area within National Forests boundaries is equivalent to some 10% of the area of the continental United States. Over 40% of this land is within areas now experiencing severe economic distress. Proper management, development, and utilization of these lands are important factors in permanent improvement of these local economies. Millions of people who live in and near the National Forests are supported in whole or in part through the economic development arising from the forests and their resources.

c. The National Forests supplied 11.2 billion board feet of timber in fiscal year 1965 to the Nation's forest products industries. This is expected to increase to 11.4 billion board feet in 1966. Dependence of the forest products industries on National Forest timber continues to increase as the result of depletion of good quality timber on private lands.

d. About 6 million head of domestic livestock (including calves and lambs) are grazed on the National Forests and Grasslands.

e. These lands provide protection to municipal water supplies for nearly all western cities and towns and many in the east, to irrigation water used on about 20 million acres of western lands, and to many streams with water power developments. They provide flood protection to thousands of acres of rich valley lands and help to prevent more rapid siltation of reservoirs and stream channels.

f. They provide a habitat for a large part of the big game animal population, for birds, for millions of small game animals and furbearers, and for fish.

g. They provide opportunities for healthful outdoor recreation, with a minimum of restrictions, for millions of people who yearly visit the National Forests.

h. Forestry research. The Forest Service conducts research in the entire field of forestry and the management of forest and related ranges. This includes the growth and harvesting of timber, its protection from fire, insects, and diseases, the protection and management of watersheds, and improved methods for development and management of recreation resources. It conducts studies in forest economics, marketing of forest products, and a survey of the present extent and potential growth and use of the Nation's forest resources. It also conducts research to develop new and improved products from wood, to increase efficiency of utilizing forest products, and to advance the efficiency and mechanization of forestry operations. Results of research are made available to owners of private forest and range lands, to public agencies which administer such lands, to forest product industries, and to consumers. The program has a two-fold objective: (1) to backstop the National Forest development program by devising more efficient practices for protecting, managing, and utilizing forest resources; and (2) to develop new and improved practices that will lead to sounder uses of forests in other public and private ownerships and more efficient and profitable utilization and marketing of forest products.

The Forest Service also cooperates with the Agricultural Research Service of the Department by reviewing and appraising for technical adequacy forest research projects beneficial to the United States which are conducted abroad. These projects are carried out with foreign currencies under Section 104(k) of Public Law 480, as amended, and the dollar expenses of the Forest Service in connection with this work are paid from the appropriation "Forest Protection and Utilization."

3. Cooperation with State and private forest landowners. The Forest Service cooperates with State agencies and private forest owners to (a) better protect the 440 million acres of State and privately owned forests and critical watersheds against fires, insects, and diseases; (2) encourage better forest practices, both for resource conservation and profit, on the 358 million acres of private forest land; (c) aid in the distribution of planting stock for forests, shelterbelts, and wood lots; (d) stimulate development and proper management of State, county and community forests.

The Forest Service is also responsible for carrying out the provisions of Section 401 of the Agricultural Act of 1956 (16 U.S.C. 568e), by providing assistance to the State Forester or equivalent State official, through advice, technical assistance, and financial contributions for increased tree planting and reforestation work, in accordance with plans submitted by the State and approved by the Secretary of Agriculture.

Proper administration, protection, and development of these forest resources is essential as they must be so managed as to yield the maximum resource potential. In many rural areas, the forestry resource is the key to the establishment and maintenance of sound local economies. The State and private forestry programs of the Forest Service are a vital part of the Department of Agriculture's overall rural area development program.

Other work related to forestry includes:

4. Insect and disease control. Activities to suppress and control destructive insects and diseases that threaten timber areas include two types of work carried on jointly by Federal, State, and private agencies: (a) Surveys on forest lands to detect and evaluate infestations of forest insects and infections of tree diseases and determination of protective measures to be taken, and (b) control operations to suppress or eradicate forest insects and diseases, including white pine blister rust.
5. Flood prevention and watershed protection. On National Forest lands and on non-Federal forest lands within the watersheds authorized for treatment by the Department of Agriculture under the Flood Control Act of December 22, 1944, the Forest Service plans and installs watershed improvement measures, in the form of minor physical structures, cultural measures, and intensified fire control, to retard runoff and reduce flood water and sediment damage. Work on non-Federal land is carried on in cooperation with the Soil Conservation Service and the appropriate State and local agencies.

The Forest Service also cooperates with the Soil Conservation Service, appropriate State agencies and the local organizations sponsoring small watershed protection and flood prevention projects initiated under the Watershed Protection and Flood Prevention Act of 1954, as amended, in planning and installing forestry and related land resource measures on the watersheds. The Forest Service also collaborates with the Soil Conservation Service, other Federal and State agencies in the conduct of comprehensive river basin studies relating to the development of water and related land resources under authority of Public Law 89-80 and section 6, Public Law 83-566.

6. Work performed for others. The Forest Service is frequently called upon to perform services for other Federal, State, or private agencies on a reimbursable or advance payment basis. Examples of these activities are:
 - a. Protection of other Federal and non-Federal forest lands intermingled with the National Forests.
 - b. Disposal of slash resulting from sales of timber and the rehabilitation of such areas.
 - c. Construction and maintenance of roads, and other improvements.
 - d. Research investigations in forest, range, and water management and utilization problems.
 - e. Cooperative survey, mapping, administrative, and reforestation projects, etc.
 - f. Cooperation with defense and mobilization agencies on forest production and utilization projects, and related work.
 - g. Acquire lands for outdoor recreation purposes under the Land and Water Conservation Fund Act.
 - h. Construct, equip, and operate Job Corps centers to carry out part of the youth program authorized by the Economic Opportunity Act.
7. Rural fire defense. The Forest Service, as a part of its regular programs, also directs Federal activities and provides technical guidance and training to States concerned with the prevention and control of fires which might be caused by an enemy attack in rural areas of the United States.
8. Timber Development Organization Loans and Technical Assistance. The Forest Service provides technical assistance and loans to timber development and utilization of timber stands in the Appalachian region.

The Forest Service maintains its central office in Washington, with program activities decentralized to 10 regional offices, 130 forest supervisors' offices, 819 district rangers' offices, 10 forest and range experiment stations, the Institute of Tropical Forestry, and the Forest Products Laboratory.

Summary of Estimated Appropriations and Receipts, 1966 and 1967

	Estimated Available 1966	Budget Estimates 1967	Increase (+) or Decrease (-)
<u>Appropriations</u>			
Forest protection and utilization:			
Forest land management	\$164,152,000:	\$172,856,000:	+\$8,704,000
Forest research	37,372,000:	34,435,000:	-2,937,000
State and private forestry co- operation	17,558,000:	17,897,000:	+339,000
Total, Forest protection and utilization	a/ b/ 219,082,000:	225,188,000:	+6,106,000
Forest roads and trails	a/ c/ 102,136,000:	102,530,000:	+394,000
Acquisition of lands for National Forests, Special Acts	80,000:	80,000:	- -
Acquisition of lands for Uinta National Forest	- - :	300,000:	+300,000
Cooperative range improvements	700,000:	700,000:	- -
Assistance to States for tree planting	a/ 1,000,000:	1,000,000:	- -
Timber development technical assistance and related loans	a/ - - :	500,000:	+500,000
Expenses, brush disposal (permanent)	a/ 8,500,000:	8,600,000:	+100,000
Roads and trails for State (permanent)	14,203,671:	14,700,000:	+496,329
Forest fire prevention (permanent)	a/ 32,000:	32,000:	- -
Restoration of forest lands and improvements (permanent)	a/ 100,000:	100,000:	- -
Payment to Minnesota (permanent) ..	140,619:	141,000:	+381
Payments to counties, National Grasslands (permanent)	462,500:	462,500:	- -
Payments to school funds, Arizona and New Mexico (permanent)	112,130:	115,000:	+2,870
Payments to States, National Forests fund (permanent)	35,504,367:	36,800,000:	+1,295,633
Total	382,053,287:	391,248,500:	+9,195,213
Deduct permanent appropriations shown in detail above	59,055,287:	60,950,500:	+1,895,213
Total, (excluding permanent appropriations)	322,998,000:	330,298,000:	+7,300,000

Receipts

Forest resource utilization	154,850,000:	158,975,000:	+4,125,000
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a/ In addition, prior year balances are available.

b/ Exclusive of \$303,000 transferred to General Services Administration.

c/ Includes proposed supplementals due to increased pay costs (P.L. 89-301) as follows:

Forest protection and utilization:

Forest land management	\$2,135,000
Forest research	610,000
State and private forestry cooperation .	45,000
Forest roads and trails	964,000

(a) Forest Protection and Utilization

	<u>Forest Land Management</u>	<u>Forest Research</u>	<u>State and Private Forestry Cooperation</u>	<u>Total</u>
Appropriation Act, 1966	a/ \$162,318,000	\$36,764,000	\$17,513,000	\$216,595,000
Proposed supplemental 1966, for increased pay costs	2,135,000	610,000	45,000	2,790,000
Transferred to "Operating Expenses, Public Building Service, General Services Adminis- tration" for space rental	-301,000	-2,000	- -	-303,000
Base for 1967	164,152,000	37,372,000	17,558,000	219,082,000
Budget Estimate, 1967	<u>172,856,000</u>	<u>34,435,000</u>	<u>17,897,000</u>	<u>225,188,000</u>
Increase	<u>+8,704,000</u>	<u>-2,937,000</u>	<u>+339,000</u>	<u>+6,106,000</u>

a/ In addition, \$700,000 is available by transfer from Cooperative Range Improvements.

SUMMARY OF INCREASES AND DECREASES

	<u>1966 Available</u>	<u>Increase or Decrease</u>		<u>1967 Estimate</u>
		<u>Pay Costs</u>	<u>Other</u>	
<u>Forest Land Management:</u>				
Timber sales administration and management to increase volume of timber cut and sold	\$30,809,000	+\$209,000	+\$617,000	\$31,635,000
Provide increased emphasis in development of new recreation facilities in Eastern United States	28,604,000	+149,000	+1,123,000	29,876,000
Conduct hydrologic surveys and prepare plans of management to increase quality of water yield, etc.	5,722,000	+29,000	+510,000	6,261,000
Accelerate examination and appraisal of lands involved in exchange transactions, etc.	4,345,000	+31,000	+1,429,000	5,805,000
Stabilize air attack program in connection with forest fire prevention	24,454,000	+150,000	+516,000	25,120,000
Additional payments to Employees' Compensation Fund	669,000	- -	+64,000	733,000
Meet costs associated with water development projects built by other agencies	4,770,000	+14,000	+1,632,000	6,416,000

	1966 Available	Increase or Decrease		1967 Estimate
		Pay Costs	Other	
<u>Forest Land Management: (continued)</u>				
Continue land acquisition program, particularly in Appalachian region	680,000	- -	+1,800,000	2,480,000
All other	<u>64,099,000</u>	<u>+431,000</u>	<u>- -</u>	<u>64,530,000</u>
Total, Forest land management	<u>164,152,000</u>	<u>+1,013,000</u>	<u>+7,691,000</u>	<u>172,856,000</u>
<u>Forest Research:</u>				
Broaden utilization of Appalachian timber	6,077,000	+43,000	+385,000	6,505,000
Develop improved methods of harvesting and transporting Appalachian timber	416,000	+3,000	+252,000	671,000
Intensify inventories of timber resources of Appalachia	1,939,000	+14,000	+102,000	2,055,000
Research to improve efficiency of marketing timber, logs, lumber, and other forest products of Appalachia	1,491,000	+10,000	+272,000	1,773,000
Reduction for nonrecurring forest research construction projects	4,183,000	- -	-4,183,000	- -
All other	<u>23,266,000</u>	<u>+165,000</u>	<u>- -</u>	<u>23,431,000</u>
Total, Forest research	<u>37,372,000</u>	<u>+235,000</u>	<u>-3,172,000</u>	<u>34,435,000</u>
<u>State and Private Forestry Cooperation:</u>				
Continue at the 1966 level stepped-up program of general forestry assistance tailored to needs of area defined in Appalachian Regional Development Act of 1965	920,000	+6,000	+322,000	1,248,000
All other	<u>16,638,000</u>	<u>+11,000</u>	<u>- -</u>	<u>16,649,000</u>
Total, State and private forestry cooperation	<u>17,558,000</u>	<u>+17,000</u>	<u>+322,000</u>	<u>17,897,000</u>
TOTAL, Forest Protection and Utilization	<u>219,082,000</u>	<u>+1,265,000</u>	<u>+4,841,000</u>	<u>225,188,000</u>

PROJECT STATEMENT

Project	1965	1966 (estimated)	Increases and Decreases:		1967 (estimated)
			Increased Pay Costs (PL 89-301)	Other	
FOREST LAND MANAGE- MENT:					
National Forest protection and management:					
(1) Timber resource management:					
(a) Sales adminis- tration and management	\$30,891,965	\$30,809,000	+\$209,000	+\$617,000	\$31,635,000
(b) Reforestation and stand improvement	15,168,195	17,360,000	+70,000	- -	17,430,000
(2) Recreation- public use	27,029,362	28,604,000	+149,000	+1,123,000	29,876,000
(3) Wildlife habi- tat management .	3,329,922	3,872,000	+25,000	- -	3,897,000
(4) Range resource management:					
(a) Management ..	5,868,782	5,362,000	+42,000	- -	5,404,000
(b) Revegetation	2,554,466	2,810,000	+10,000	- -	2,820,000
(c) Improvements	3,186,244	3,379,000	+16,000	- -	3,395,000
(5) Soil and water management	8,934,169	5,722,000	+29,000	+510,000	6,261,000
(6) Mineral claims, leases, and special uses	3,917,416	3,976,000	+28,000	- -	4,004,000
(7) Land classi- fication, adjust- ments, and surveys:	4,685,929 ^{a/}	4,345,000	+31,000	+1,429,000 ^{a/}	5,805,000
(8) Forest fire protection	22,367,120	24,454,000	+150,000	+516,000	25,120,000
(9) Structural im- provements for fire and general purposes (con- struction and maintenance)	12,898,951	10,865,000	+44,000	- -	10,909,000
(10) Payments to Employees' Com- pensation Fund ..	614,581	669,000	- -	+64,000	733,000
Subtotal	141,447,102	142,227,000	+803,000	+4,259,000	147,289,000
Amount advanced from "Cooperative Range Improvements":	-700,000	-700,000	- -	- -	-700,000
Subtotal, National Forest protection and management ..	140,747,102	141,527,000	+803,000	+4,259,000	146,589,000

(Continued on next page)

Project	1965	1966 (estimated)	Increases and Decreases:		1967 (estimated)
			Increased	Other	
			Pay Costs (PL 89-301)		
(11) Water resource development related activities	1,229,761	4,770,000	+14,000	+1,632,000	6,416,000
(12) Fighting forest fires	18,309,104	5,000,000	- -	- -	5,000,000
(13) Insect and disease control:					
(a) White pine blister rust control	3,607,087	b/ 3,640,000	+55,000	- -	b/3,695,000
(b) Other pest control	6,965,694	c/ 8,535,000	+141,000	- -	c/8,676,000
Subtotal, Insect and disease control	10,572,781	12,175,000	+196,000	- -	12,371,000
(14) Acquisition of lands (Weeks Act)	1,677,574	680,000	- -	+1,800,000	2,480,000
Total, Forest Land Management	d/172,536,322	164,152,000	+1,013,000	+7,691,000	172,856,000
FOREST RESEARCH:					
Forest and range management research:					
(15) Timber management research ...	7,694,506	8,027,000	+58,000	- -	8,085,000
(16) Watershed management research	3,139,459	3,280,000	+23,000	- -	3,303,000
(17) Range management research ...	1,247,920	1,258,000	+9,000	- -	1,267,000
(18) Wildlife habitat research ...	739,948	730,000	+5,000	- -	735,000
(19) Forest recreation research ...	479,973	516,000	+3,000	- -	519,000
Subtotal, Forest and range management research ...	13,301,806	13,811,000	+98,000	- -	13,909,000
Forest protection research:					
(20) Forest fire research	1,952,220	2,860,000	+20,000	- -	2,880,000
(21) Forest insect research	3,479,977	3,856,000	+27,000	- -	3,883,000
(22) Forest disease research	2,036,402	2,081,000	+15,000	- -	2,096,000
Subtotal, Forest protection research	7,468,599	8,797,000	+62,000	- -	8,859,000

(Continued on next page)

Project	Increases and Decreases:				
	1965	1966 (estimated)	Increased :		1967 (estimated)
			Pay Costs :	Other :	
			(PL 89-301) :		
Forest products and engineering research:					
(23) Forest products utilization research	5,835,163:	6,077,000:	+43,000:	+385,000:	6,505,000
(24) Forest engineering research	755,122:	416,000:	+3,000:	+252,000:	671,000
Subtotal, Forest products and engineering research .	6,590,285:	6,493,000:	+46,000:	+637,000:	7,176,000
Forest resource economics research:					
(25) Forest survey	1,977,690:	1,939,000:	+14,000:	+102,000:	2,055,000
(26) Forest products marketing research	1,266,691:	1,491,000:	+10,000:	+272,000:	1,773,000
(27) Forest economics research .	588,251:	658,000:	+5,000:	- -:	663,000
Subtotal, Forest resource economics research	3,832,632:	4,088,000:	+29,000:	+374,000:	4,491,000
(28) Forest research construction	3,867,864 ^{e/}	4,183,000:	- -:	-4,183,000:	- -
Total, Forest Research:	35,061,186:	37,372,000:	+235,000:	-3,172,000:	34,435,000
STATE AND PRIVATE FORESTRY COOPERATION:					
(29) Cooperation in forest fire control:	12,761,686:	12,803,000:	+8,000:	- -:	12,811,000
(30) Cooperation in forest tree planting:	301,699:	300,000:	- -:	- -:	300,000
(31) Cooperation in forest management and processing ...	3,016,953:	3,535,000:	+3,000:	- -:	3,538,000
(32) General forestry assistance .	1,211,956:	920,000:	+6,000:	+322,000:	1,248,000
Total, State and Private Forestry Cooperation	17,292,294:	17,558,000:	+17,000:	+322,000:	17,897,000
Total, Forest Protection and Utilization :	f/224,889,802:	219,082,000:	+1,265,000:	+4,841,000:	225,188,000
Unobligated balance lapsing	1,682,875:	- -:	- -:	- -:	- -
(33) Total increased pay costs (PL 89-301)	- -:	(2,932,000):	(+1,265,000):	(+155,000):	(4,352,000)
Total available or estimate	g/226,572,677:	219,082,000:	+1,265,000:	+4,841,000:	225,188,000

- a/ Includes allocation to the Department of the Interior, Bureau of Land Management: 1966, \$255,000; 1967, \$285,000.
- b/ Includes allocation to the Department of the Interior, Bureau of Land Management: 1966, \$349,000; 1967, \$386,000.
- c/ Includes allocation to the Department of the Interior, Bureau of Land Management: 1966, \$732,000; 1967, \$763,000.
- d/ Excludes obligations of \$403,835 incurred in 1965 against funds provided by Deficiency Appropriation Act, PL 88-317, approved June 9, 1964. Summary follows:

Obligations, fiscal year 1965	\$403,835
Unobligated balance lapsing	246,165
Total appropriated	650,000

- e/ Includes \$75,000 provided in Supplemental Appropriation Act, 1966 (PL 89-301).
- f/ Represents obligations as follows:

Obligated fiscal year 1965	\$217,643,603
Obligations, fiscal year 1965 per footnote	
<u>d/</u> above	403,835
Estimated obligations, fiscal year 1966,	
per footnote <u>g/</u> below	7,246,199
Applied costs, fiscal year 1965	214,772,894

The difference of \$10,520,743 reflects, primarily, contracts made and orders placed in 1965 over contractual services and equipment received in that year, and portion of funds shown in footnote g/ below to be obligated in 1966.

- g/ Includes following provided in Second Supplemental Appropriation Act, 1965 (PL 89-16):

	Pacific Northwest 12/64-1/65 <u>Flood Damages</u>	Appalachian Region
<u>Forest Land Management:</u>		
Sales administration and management	\$346,000	
Recreation-public use	677,000	
Wildlife habitat management ..	35,000	
Range resource improvements ..	44,000	
Soil and water management	2,418,000	\$1,000,000
Forest fire protection	270,000	
Structural improvements for fire and general purposes ...	410,000	
Acquisition of lands, Weeks Act		1,000,000
Total, Forest land management	4,200,000	2,000,000

Appalachian
Region

Forest Research:

Forest products utilization research	500,000
Forest engineering research ...	300,000
Forest survey	125,000
Forest products marketing research	<u>300,000</u>
Total, Forest research	1,225,000

State and Private Forestry

Cooperation:

General forestry assistance ...	350,000
---------------------------------	---------

These amounts have been or will be obligated during the period
1965-1966.

JUSTIFICATIONS OF 1967 ESTIMATES

(1) Timber Resource Management

(a) Sales administration and management \$31,635,000

An increase of \$826,000 is needed for the following purposes:

- (A) \$617,000 to permit timber harvesting on the National Forests to more nearly meet constantly increasing demands by the wood-using industry for timber.
- (B) \$209,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The fiscal year 1966 timber harvesting program of 11.4 billion board feet will be increased by 200 million feet to a total of 11.6 billion in 1967. This program increment reflects the increasing dependence industry is placing upon National Forests to supply their roundwood requirements. It is also indicative of industry pressure to expand its raw material sources into heretofore inaccessible and lower quality timber.

There are pressures in the timber resource management program that are becoming increasingly difficult to contain.

There is need for better planning and coordination of timber harvesting with other resources and uses, most particularly with scenery and related recreational requirements. The President's Natural Beauty Program has an impact upon the way much National Forest timber is cut.

Second growth management is becoming increasingly necessary to supply the total requirements of industry. Second growth management entails higher unit costs for selling and harvesting timber since smaller trees are being handled and there are smaller volumes per acre cutover.

A rising trend in sales business is taking place in the East, stimulated to some extent by the need for increased employment in the Appalachian area. Timber in the eastern National Forests is largely second growth.

With nearly one-third of total industrial roundwood requirements being supplied by National Forests, the job of administering this disposal program has become intensely complex. Greater use of improved data processing methods is being sought to provide better business conditions and to reduce long-term costs. A newly developed sale contract with improved contractual concepts has been placed in effect. Investigation and study of improved procedures is continuing.

Project (1-a)

These factors all affect basic costs of doing business. Every effort is being made to reduce costs and improve efficiency. Proposed increases cover only program increases and pay act costs.

The requirements of the burgeoning sales business make it urgent that the proposed program increase be approved to maintain industry momentum. Inadequate financing to meet this increased tempo would lead to a reduction in volume harvested and an artificial timber shortage. Wood-using industries dependent upon National Forest timber would be forced to curtail their operations and timber receipts would be reduced significantly.

The proposed program follows:

Sale preparation 12.0 billion board feet @ \$0.71/M ...	\$8,500,000
Sale administration 11.6 billion board feet	
@ \$1.83/M	21,285,000
Advance sale preparation 2.2 billion board feet	
@ \$0.14/M	310,000
Timber inventories and management plans	1,540,000
	<hr/>
Total	31,635,000

Examples of Recent Accomplishments

Sales administration. For the third consecutive year, a record high volume of timber has been harvested from the National Forests. During fiscal year 1965, 11.2 billion board feet was cut--200 million board feet more than in the previous year. Receipts to the Treasury from this record volume harvested amounted to \$138.8 million--an average of \$12.39 in receipts per thousand board feet harvested--and a gain of \$10.8 million over the preceding year. A total of 11.5 billion board feet of timber was sold on the National Forests during fiscal year 1965.

Efforts in finding ways to reduce costs of timber sale preparation and administration continue. Improvements in handling customer accounts have been made and procedure for automating such accounts is being explored. Use of programmed techniques for training Forest Service personnel in the use of the newly developed timber sale contract is expected to result in savings amounting to nearly \$480,000 over the cost of conventional training methods. Timber industry associations are using portions of the programmed training material to acquaint industry people with the timber sale contract.

Progress in meeting the sustained yield allowable cut objectives during the past five years and the estimated for fiscal year 1966 are shown in the following table. A comparison between the actual cut and the annual allowable cut is shown in Figure A-1.

(Volumes in Billions of Board Feet)

<u>Fiscal Year</u>	<u>Annual Allowable Cut ^{2/}</u>	<u>Actual Volume Cut</u>	<u>Percent of Allowable Cut Harvested</u>	<u>Actual Volume Sold</u>	<u>Percent of Allowable Cut Sold</u>
1961	10.4	8.4	81	8.9	86
1962	10.5	9.0	86	10.3	98
1963	11.3	10.0	88	12.2	108
1964	12.0	11.0	92	11.7	98
1965	12.0	11.2	93	11.5	96
1966 ^{1/}	(11.9)	(11.4)	(96)	(12.0)	(101)

^{1/} Figures in parenthesis are estimates.

^{2/} As of January 1 preceding the fiscal year. Annual allowable cut includes only sawtimber for National Forests west of the Great Plains and in Alaska, and sawtimber and convertible products for National Forests in the eastern half of the United States.

Timber inventories and management plans. Revised plans were approved for 19 working circles containing 10,805,000 acres of commercial forest land in fiscal year 1965. This is about the rate of planning that must be maintained on an annual basis to be in agreement with changing inventories, economic and forest area conditions. Inventory data compilation and analysis have been automated and procedures have been developed and are being tested for automating management plan records. As pressures mount to use all the forest resources, more precise and detailed timber harvest planning must be undertaken to minimize conflicts and enable harmonious multiple use of forest area.

TIMBER RESOURCE MANAGEMENT

COMPARISON OF ANNUAL ALLOWABLE CUT AND ACTUAL VOLUME HARVESTED 1957 - 1967

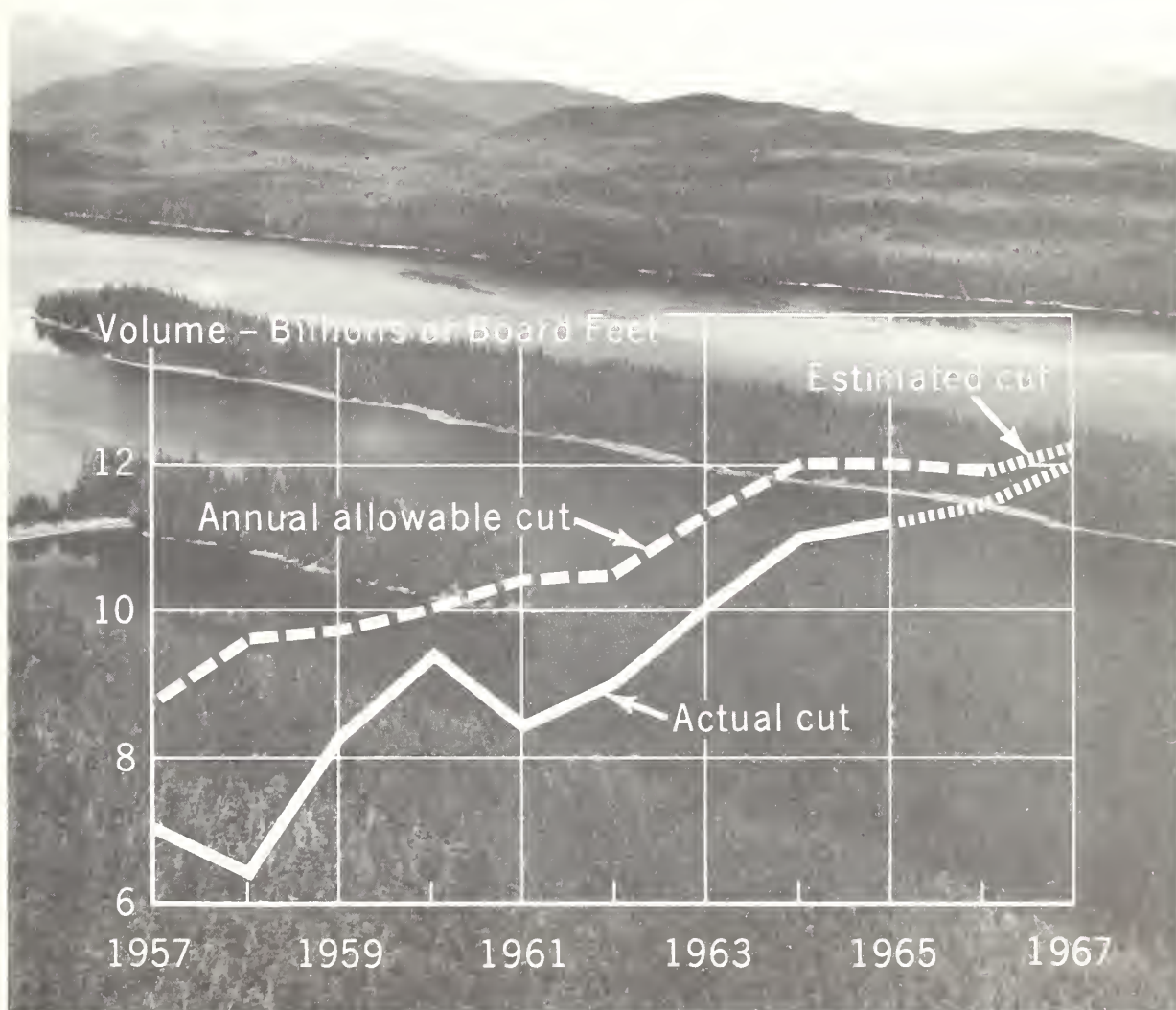


Figure A-1



Properly managed timber stands are essential components of desirable forest environment experiences. In areas such as that shown above, timber stands add much to the esthetic enjoyment derived by the recreationist, yet still provide a source of raw material for wood-based industries. Developing the necessary prescriptions to permit such harmonious use is time consuming and adds considerably to the cost of managing the timber resource.

Figure A-2

(b) Reforestation and Timber Stand Improvement \$17,430,000

An increase of \$70,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The overall program is necessary for increasing timber growth and improving timber quality on the National Forests to supply raw materials needed by industry, to sustain dependent communities and meet demand of the rapidly growing population for wood and wood products. Reforestation restores natural forest beauty to lands that have been burned over by forest fire or cut over by logging operations. Timber stand improvement enhances natural beauty by restoring normal growth and development to trees in stagnated or suppressed young stands and improves other forest values, including recreation, wildlife habitat, water yield, etc., by opening the young stands to access, reducing crown cover and stimulating growth of understory vegetation. (See Figures B-1 and B-2.) The tree improvement program is carried on to produce genetically superior tree seed for the purpose of improving the growth and quality of timber trees and to increase their resistance to diseases and insects.

Reforestation of 3.8 million acres of idle timber land and cultural treatment of 10 million acres of young growth should be completed by 1972 as set forth in the Program for Development of the National Forests if the benefits are to be realized in the projected period of need. Current and future allowable cut of National Forest timber is predicated on the assumption that management will be intensified to increase growth in young stands and timber growth will be restored on deforested timber land.

Accomplishment in four years through 1966 will be only 17% of the 1972 program objective. Accomplishment in each of the remaining six years would have to be three times the 1966 program to attain the production objectives.

Progress on accomplishing the reforestation and timber stand improvement objectives in the Program for Development of the National Forests is seriously short of acreage goals for the first ten years -- see Figure B-1 for reforestation progress and Figure B-2 for stand improvement progress.

Examples of Recent Accomplishments

Reforestation. 124,694 acres of National Forest land were reforested with appropriated funds in fiscal year 1965; 97,386 acres were planted; 22,233 acres were seeded and 5,075 acres were reforested by natural seed fall on land specially prepared to encourage germination and growth. Some 85,000 acres of site preparation were completed with fiscal year 1965 funds and carried over to be planted in fiscal year 1966. Other reforestation accomplishments include procurement of 98,424 pounds of tree seed (33,067 pounds were purchased from seed companies and 65,357 pounds were processed in Forest Service extractories from cones purchased from local people); modernization and expansion at eleven Forest Service tree nurseries and progress on genetic improvement of tree seed (138 acres of new seed orchards and 349 acres of new seed production areas were established).

Project (1-b)

In addition to reforestation accomplishments with appropriated funds, the following work was done on areas cut over by timber sale with funds collected under authority of the Knutson-Vandenberg Law: 95,398 acres were planted, 17,676 acres were seeded, and 20,997 acres were reforested by natural seed fall on areas prepared by cultivation to encourage germination and growth.

The area of National Forest land reforested by planting and seeding in fiscal year 1965 with appropriated and Knutson-Vandenberg funds, exclusive of the area reforested by natural seed fall, totaled 232,693 acres. This is the greatest reforestation accomplishment by these methods in any year. The previous high was in 1936 during the CCC program when 223,075 acres were planted and seeded.

An estimated area of 128,000 acres will be reforested by planting and seeding with appropriated funds in fiscal year 1966. Accomplishments with Knutson-Vandenberg funds are expected to be about the same as in 1965.

Timber stand improvement. 181,051 acres of young growth were treated by various cultural measures with appropriated funds to increase growth and improve timber quality. The work consisted principally of thinning and release. An additional area of 63,924 acres were lightly burned over by prescription in the southern pine types to increase growth by reducing competition of understory brush.

In addition to timber stand improvement accomplished with appropriated funds, 253,212 acres were thinned, released or pruned and 77,411 acres of southern pine type were lightly burned by prescription to improve residual young growth on areas cut over by timber sale, with Knutson-Vandenberg funds.

An estimated area of 180,000 acres of young growth will be treated by stand improvement measures with appropriated funds in fiscal year 1966. Accomplishments with Knutson-Vandenberg funds are expected to be about the same as in 1965.

REFORESTATION



Site preparation - Donner Burn Tahoe N.F. California 1964

Reforestation is needed now to meet future demands for timber. Unmerchantable fire killed trees are piled and burned to reduce fire hazard and remove unsightly snags. Furrows are for tree planting and erosion control.

PROGRESS ON NATIONAL FOREST 10-YEAR DEVELOPMENT PROGRAM

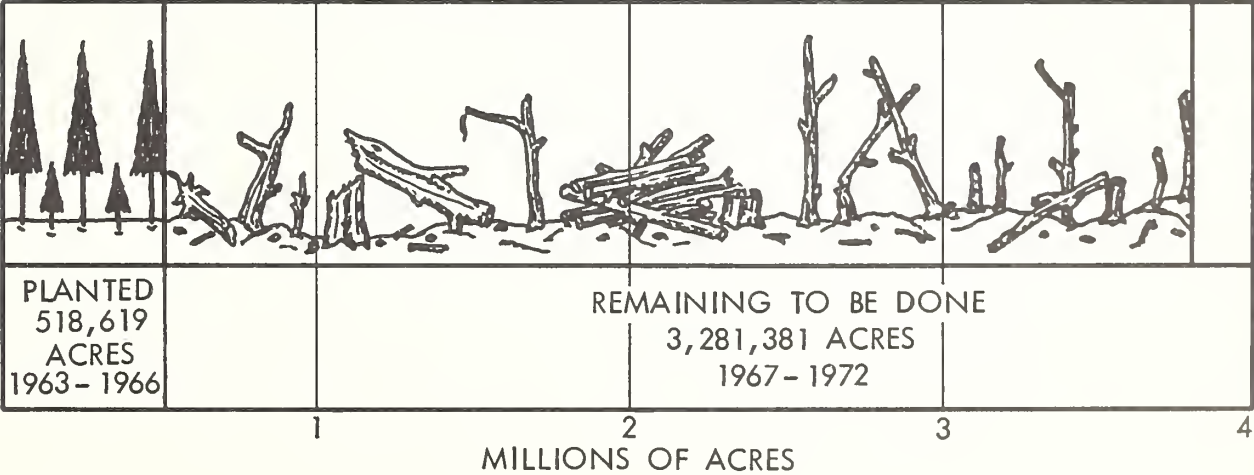
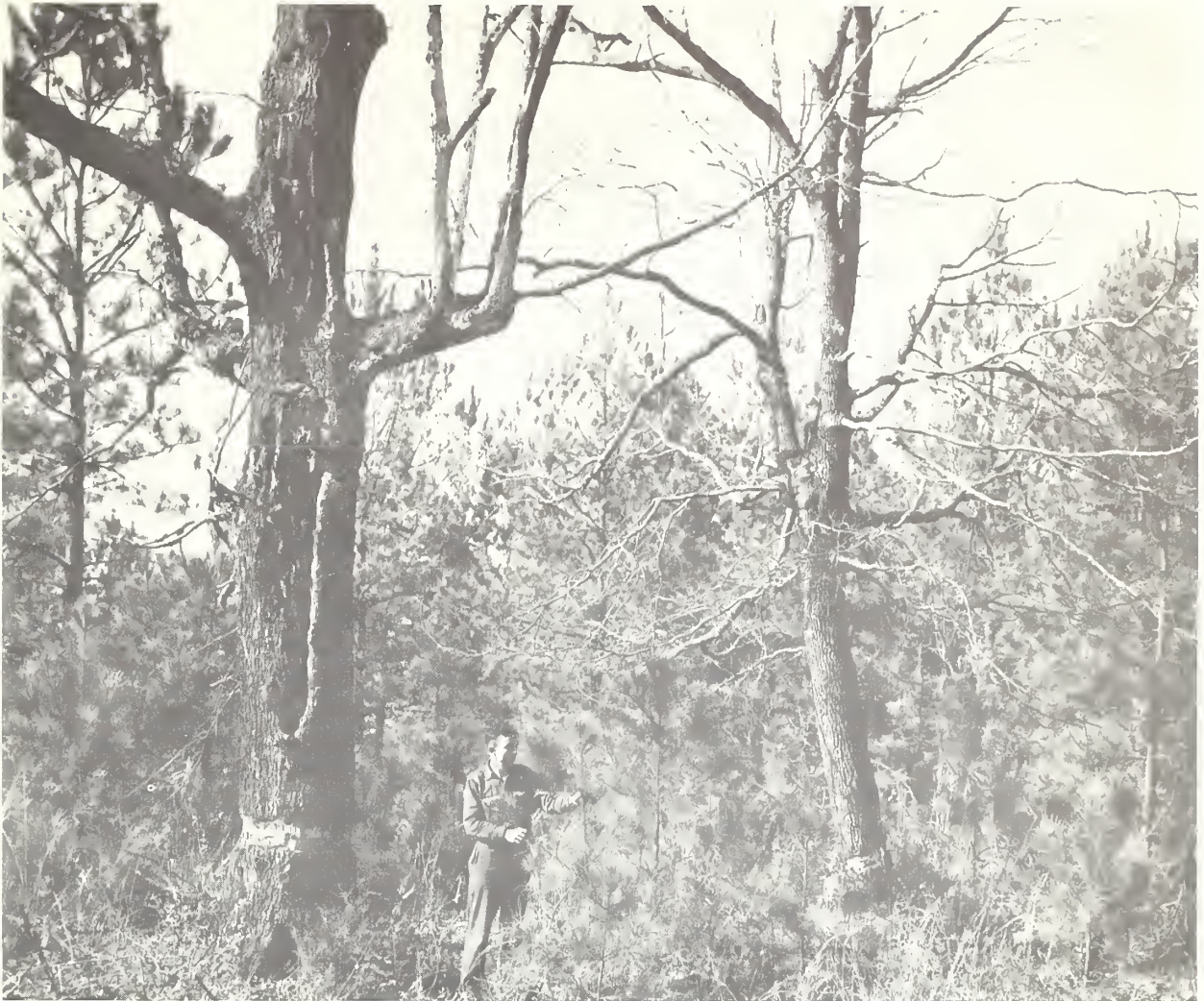


Figure B-1

TIMER STAND IMPROVEMENT



Young timber stand released by killing cull trees, Sumter N F. South Carolina. Small pine trees are same age as large ones. Release will restore normal growth. Wildlife opening in foreground.

PROGRESS ON NATIONAL FOREST 10-YEAR DEVELOPMENT PROGRAM

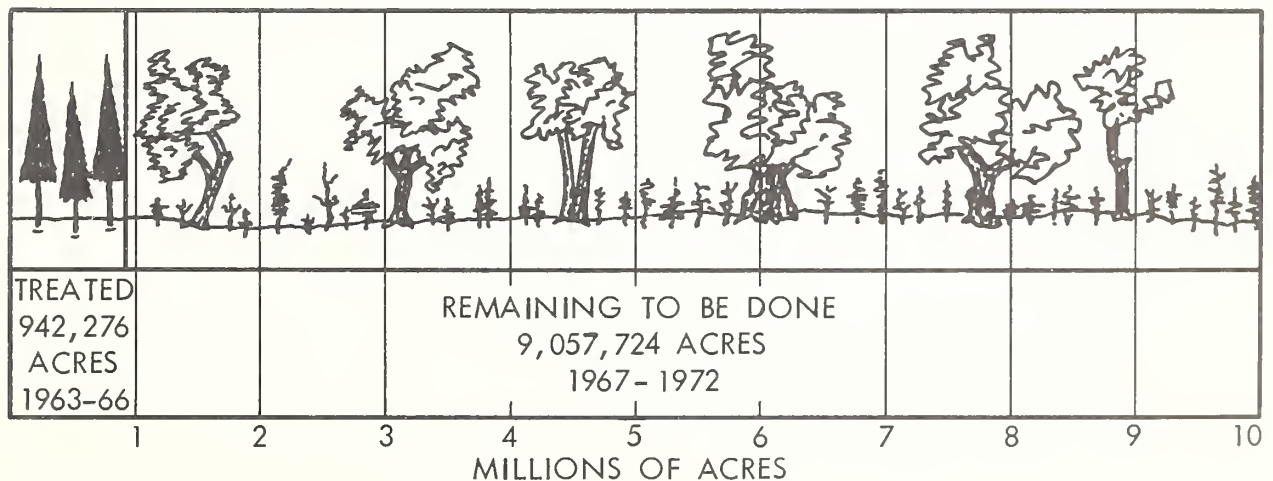


Figure B-2

(2) Recreation-Public Use \$29,876,000

An increase of \$1,272,000 is needed for the following purposes:

- (a) \$1,123,000 will more nearly provide for current operation, cleanup and maintenance of recreation areas and their facilities; to increase somewhat the number of new sites so badly needed and to improve older existing sites so as to accommodate the increasing numbers of visitors who come to use them; to regulate and provide the many new services now being required; to provide for special recreation projects such as the National Recreation Areas established by recently enacted legislation; and to provide necessary visitor information service.
- (b) \$149,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The National Forest recreation-public use program embraces the following categories of work:

OPERATION AND MAINTENANCE

Cleanup of undeveloped sites, roads, and trails. There are more than 300,000 miles of roads and trails, 90,000 miles of fishing streams, and 30,000 miles of lake and reservoir shores, within the National Forests. These are used by hikers, picnickers, hunters, fishermen, and automobilists, totaling more than 100 millions of visits. The millions of acres immediately bordering these features must be kept free of litter and generally cared for. The sum of \$250,000 is needed to cover the approximate cost of this.

Sanitation and cleanup of developed sites. There are about 9,300 developed sites for camping and picnicking, boating, swimming, etc., on the National Forests with a capacity of perhaps 500,000 persons at a time. These must be kept sanitary, free of litter, and guarded to maintain order and safe use. The sum of \$6,730,000 is needed for this purpose.

Maintenance of developed sites. The above-described sites must be maintained by painters, carpenters, danger-tree fellers and equivalent craftsmen to ensure the safety of the recreationists and to protect the investment in these substantially developed areas. The sum of \$6,045,000 is needed for this task.

Administration of National Forest wilderness. The administration of National Forest Wilderness and Primitive Areas to ensure their preservation despite heavy visitation has taken on new importance with the enactment of the Wilderness Act of 1964. There are 14,500,000 acres of these areas and they receive about one million visits a year. The sum of \$500,000 is needed to pay for the initial work of planning, making studies, posting boundaries, and providing information as required by the new law. This level of financing is less than 30% of what is estimated as needed to do the job to desirable standards, but is related to reaching that level in three steps rather than all in one year.

DEVELOPMENT

Betterment of existing facilities. A goodly proportion of National Forest recreation facilities is from 12 to 30 years old. Here water systems are unreliable and need improvement or replacement; toilets are of a standard difficult to maintain; campgrounds have multiple entrances that limit collection of user fees as required by the new Land and Water Conservation Fund Act of 1965. A major program of betterment of old facilities and modernization of sites is urgently needed. (See Figure C-1.) The sum of \$5,000,000 is needed for this. This is less than required to bring existing facilities up to desirable standards, but in view of other high priority demands is the portion of the total assigned to this activity.

Construction of new camping, picnicking, swimming, boating, observation, etc., sites. These facilities are the ones that receive the brunt of the family use, and which are so heavily overtaxed with the resultant damage or danger to soil, vegetation, water purity, privacy, and the overall pleasurable experience of the family outing. The sum of \$8,814,000 is allotted to building 440 additional sites. Some of these will be family units accommodating camps and picnickers, others will be boat launching ramps, swimming beaches, wayside rests at vista points, and other special interest places. This sum is \$725,000 less than was available for the purpose last year, the reduction being made to provide money to pay the increased costs of cleanup, maintenance, water purity control, etc., created by increasing visitation.

Construction of special major projects. Because of unusual requirements certain projects, as a nationally significant canoe area, and some National Recreation areas require special development. The sum of \$1,137,000 is allotted to these. Typical of these areas are the Boundary Waters Canoe Area, Spruce Knob-Seneca Rocks, and Shasta-Trinity-Whiskeytown National Recreation Areas.

VISITOR INFORMATION SERVICE

An essential aspect of the administration of the recreation use of the National Forests is the vital and gradually maturing program of Visitor Information Services.

The Visitor Information Services provide information, education, and interpretation to the National Forest visitors. (See Figure C-2.) It makes them aware of the many benefits of forest lands and appreciative of the need to protect and use these lands wisely. The visitors' experience in the forest becomes more meaningful. Their understanding of the American outdoors takes on greater dimension and depth. The Visitor Information Services facilities also enhance the tourist businesses of local communities near the National Forest.

The program is expanding at a rate that does not cause excessive impact on other Forest Service management responsibilities. Now in the fifth field season, the program is geared to some limited

enlargement to more nearly meet Forest Service objective of using many simple facilities over a greater portion of the National Forest System to provide interpretation of resource management, history, conservation, wilderness, and natural history to increasing numbers of visitors.

The proposed fiscal year 1967 budget is \$1,400,000, of which \$960,000 is for operation and maintenance of present facilities and for services. It includes special interpretive programs such as evening programs at campgrounds, naturalists serving visitors at visitor centers in or near the forest and on wilderness trails.

Development is planned as follows:

a. Visitor Centers and major facilities:

1. Lewis and Clark Interpretive Complex (Lolo and Clearwater National Forests, Idaho). Construct Three Devils Information Station, Lolo Information Station and the historical facility (\$130,000).
2. Cradle of Forestry in America (National Forests in North Carolina, North Carolina). Construction of buildings present at time of first Forestry School in America (\$86,000).
3. Spruce Knob Interpretive Facility (Monongahela National Forest, West Virginia). Construct appropriate visitor facility at highest point in West Virginia (\$55,000).
4. Taylor Creek Stream Profile (Eldorado National Forest, California). A facility to interpret watershed and fisheries management at Lake Tahoe Visitor Center (\$60,000).

- b. Guided and self-guided facilities: trails, auto tours, visitor orientation facilities, in or near recreation complexes. Sixty-eight small and generally simple facilities will be developed at a cost of \$109,000. Examples: Land O'Lakes Trail (Grand Mesa-Uncompahgre National Forests, Colorado), Lost Trail Pass Auto Tour (Salmon National Forest, Idaho), Dardanelles Overlook (Stanislaus National Forest, California).

Examples of Recent Accomplishments

In calendar year 1964 the National Forest System once again experienced a record overload of recreationists. There were 133,800,000 recreation visits, compared to 122,600,000 the year before. By primary purpose of the visit -- 20.7 million for picnicking, 19.4 million for fishing, 10.8 million for hunting, 10.4 million for camping, 7.8 million for skiing and other winter sports. An additional 84.7 million visits were made to swim, hike, ride, and to enjoy the forest environment. And these 133.8 million visits did not count those who simply drove through and enjoyed the forest scenery. This past winter season saw nearly 8.5 million visits to National Forest winter sports areas and the 1965 summer season has experienced an increased demand for camping, picnicking and similar facilities at least equal to the

Project (2)

increase demanded during the past few years. The record indicates that the strong growth trend in this important National Forest activity will continue.

<u>Calendar year</u>	<u>Recreation visits to the National Forests</u>	<u>Percentage increase over 1953</u>
1953	35,403,000	--
1956	52,556,000	48
1959	81,520,000	130
1962	112,762,000	218
1963	122,582,000	246
1964	133,762,000	277
1965 (Est.)	144,000,000	307

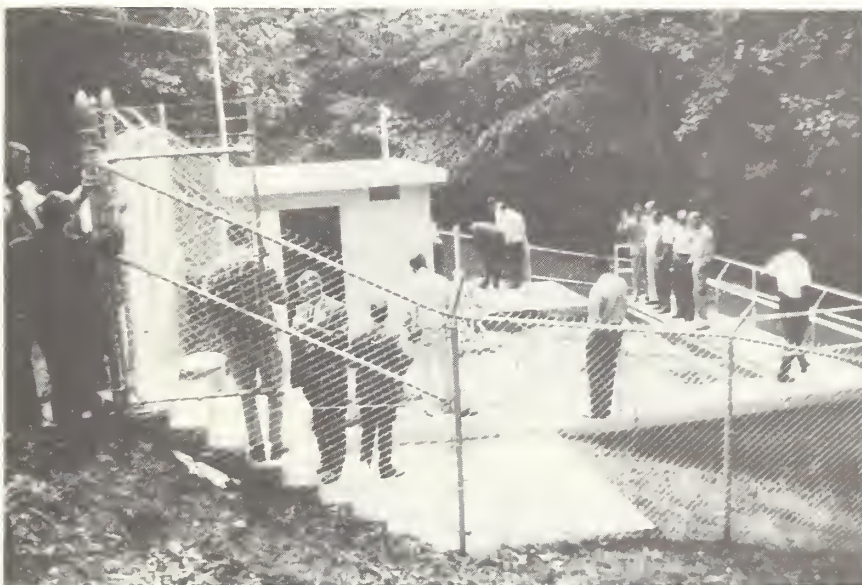
Recreation facilities were severely damaged -- wiped out in fact along some streams -- by flood exceeding all previous records during the past winter and spring in the National Forests of Washington, Oregon, California, and Utah. Severe flooding also took its toll in the Black Hills of South Dakota as well as in some other places. The total damage required more than a million dollars to restore, much of which had to come from money originally programed for new development.

Approximately 23,000 recreation special use permits are now in effect on the lands administered by the Forest Service and the number is continuing to grow. These include uses such as resorts, ski lifts, organization sites, and recreation residences. Estimated fiscal year 1965 receipts from recreation use permits will amount to about \$2,000,000.

The Land and Water Conservation Fund Act of 1965 required the installation of fee collection systems at many camp and picnic grounds. In some places this can be done by automatic ticket dispensing machines rather than by men. As of August 1, 1965, about 1,000 of these had been installed. Many more must be installed.



Modern six-stool and four-basin waterflush installation at Vogel Flat campground, Angeles National Forest near Los Angeles, California.



Modern sewage treatment plant serving a campground on the Pisgah National Forest, near Asheville, North Carolina.

Camp and picnic grounds of 20 or more family units cannot be served adequately with relatively inexpensive pit toilets. Such installations rapidly degrade the site, pollute the soil and adjacent streams, and are offensive when so heavily used. Costly waterflush toilets with adequate disposal fields, or with modern sewage treatment plants for the 50-100 or greater unit installations must be installed.

VISITOR INFORMATION SERVICE

is helping National Forest visitors
enjoy the American outdoors by . . .

acquainting them with Forest
recreational opportunities . . .



helping them to perceive
natural beauty



and to learn about the land
and the use and protection of its
resources.



Figure C - 2

(3) Wildlife Habitat Management \$3,897,000

An increase of \$25,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The more than 186 million acres of National Forests and National Grasslands produce one-third of the Nation's crop of big game animals and a substantial portion of small game and other forms of wildlife. These forests give rise to more than 80,000 miles of fishing streams, comprising a major part of the cold-water streams of the country. Hunting and fishing on these lands increased by more than two million visits in 1964, and the same upward trend is expected to continue.

Productive habitat is the key to wildlife production. Wildlife habitat can be improved by planned coordination with other resources and activities, by direct cultural practices, and through physical improvements. Under the proposed 1967 budget it is estimated that the following wildlife work will be accomplished:

Improving wildlife food and cover	58,000 acres
Providing new water facilities	800 units
Installing fish stream improvements	450 miles
Constructing lake improvements	3,000 acres

Examples of Recent Accomplishments

Habitat improvements generally are planned and developed cooperatively with the States. A variety of projects are completed annually in each region, although, generally a specific type of improvement is given greater emphasis in a particular region. For example, the Southwestern Region emphasizes development of fishing lakes in arid localities and the restoration of browse forage on depleted ranges. The North Central Region has extensive waterfowl potential and has completed a cooperative survey of potential waterfowl wetland developments. Wetlands already developed show great promise of direct benefits. (See Figure D-1.) Regions with extensive National Grasslands are planning and installing improvements needed in the management of upland game birds, waterfowl, and other wildlife.

In heavily timbered regions, particularly in the Pacific Coast States, debris jams recur on important fish-producing streams and must be removed promptly to assure passage for migrating salmon and other spawning commercial and game fishes. Much of this work is done cooperatively with the States.

With national impetus being given to endangered species protection, all regions are giving particular attention to habitat improvements that directly benefit local rare or endangered species of wildlife.

To encourage maximum participation by the States on worthwhile projects, much of the habitat improvement work is developed cooperatively at the local level with the States.

Project (3)

Major improvement accomplishments in fiscal years 1965 and 1966 are estimated as follows:

	<u>1965</u>	<u>1966</u>
Improvement of wildlife food and cover ...	58,000 acres	63,000 acres
Wildlife watering facilities and ponds ...	408 units	1,000 units
Waterfowl wetland improvements	2,000 acres	1,000 acres
Fish stream improvements	450 miles	370 miles
Fishing lake improvements	800 acres	1,200 acres



Fishing lake developed cooperatively with the State in the arid Southwest. In such localities, fishing lakes are extremely important to local residents.



The National Grasslands have considerable potential for various forms of wildlife, particularly upland game birds, antelope and deer. The development of watering facilities and proper coordination with livestock grazing to maintain food and cover vegetation are essential.



One of the many wetland areas being developed on National Forests for waterfowl production and use. (Chequamegon N.F., Wisconsin.)



Debris jam clearance to permit migration of fish is a recurring activity on many National Forests. This work is particularly important in the major salmon-producing streams and tributaries.

(4) Range Resource Management

(a) Management \$5,404,000

An increase of \$42,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

These funds will finance administration of the range resource, including work in range allotment analysis, current work in reevaluation of grazing fees, initial phases of economic evaluation of range management and improvement practices and part of the added administrative costs of providing grazing resource use to economically disadvantaged and minority groups in southern National Forests. This level of financing is \$1,440,000 below the schedule proposed in the Development Program for the National Forests for fiscal year 1967.

Acceleration of analysis work is needed to provide a basis for effective and coordinated resource management of grazed lands, including wilderness and other areas used by recreationists and their pack and saddle stock. Determination of economic feasibility of various range management and development programs for the National Forest and National Grassland areas used by twenty thousand dependent ranchers should be a part of Forest Service programs. Necessary work toward reevaluation of the user charge for livestock grazing as directed by the Bureau of the Budget should be completed in time to meet the 1968 timetable for new grazing fees. Stepping up of Forest Service work to foster sound conservation procedures on Federal and associated private land throughout the Nation through cooperatives is needed. Financing to the level proposed by the Development Program would enable the Forest Service to cover these tasks.

Examples of Recent Accomplishments

The Forest Service range job has increased 40% since 1960; expectations are that further increases may be expected. Contributing significantly to this increase has been the recognition that good management means closer or more intensive management, and closer management includes greater cooperation with range and other users. It also includes better recognition of the range job on wilderness and other classified areas, as well as in the South where the range job has not previously been recognized. Impacts created by recreation demands, timber harvest and other resource requirements and uses have added to the job.

The basis from which are built programs for good range use in the face of the increasing range job on the National Forests and National Grasslands are facts obtained through range allotment analysis. (See Figure E-1.) Range analysis, universally applicable throughout the Federal lands administered by the Forest Service, classifies the land according to its suitability for livestock grazing and assembles information about range condition, productivity and other factors. Progress in this complex resource measurement task during fiscal year 1965 made complete the initial analysis task on 3,098 of the 11,570 allotments on the National Forests and National Grasslands. Additional analysis work done on other allotments put the total accomplishment at 7,498 plan equivalents. The total analysis job on one allotment represents one plan equivalent.

Project (4a)

For several years the Forest Service has been productively engaged in a program leading to reevaluation of user charges for livestock grazing. Substantial progress has been made toward implementation of new grazing fees in the target year of 1968. In fiscal year 1965, a reevaluation method was selected; in fiscal year 1966, this method is being tested on a pilot basis with the further goal of developing a procedure for reevaluating all base fees now applicable to about 20,000 paid permits.

RANGE ALLOTMENT ANALYSIS



Information Gathered During Range Analysis
Is Put to Work to Solve Critical Land-use Problems



Eroded areas are found and mapped out as one part of the job.



Good systems of management and good range are goals of range allotment analysis.

Figure E- 1

(b) Range Revegetation \$2,820,000

An increase of \$10,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

As a result of overuse of the public grazing lands before and during the early period following their incorporation into the National Forests, the Forest Service has been faced with the long-term problem of rehabilitating depleted ranges. Improvement objectives include revegetation of four million acres of rangeland during the 10-year period beginning in 1963. The work includes replacing undesirable vegetation (Figure F-1) with plants of economic and aesthetic value, and seeding depleted lands which have little or no vegetative cover. Significant benefits to soil condition, watershed, wildlife and recreation are being realized, in addition to grazing.

The productive potential for forage growth on important segments of the National Forests will be realized through use of funds appropriated for range revegetation. Using knowledge from research and long administrative experience, grasses and other forage and soil cover plants will be established. Undesirable plants will be controlled.

Although the funds requested will aid materially toward solution of range and associated resource problems through provision of better vegetation cover, additional funds to the level of the Development Program for the National Forests would allow revegetation work to be started on control of undesirable plants that have invaded wilderness and other resource areas accessible to recreationists and other users. These plants would be replaced by plants of economic and aesthetic value in harmony with the natural environment. Existing revegetated areas would be maintained to the degree possible.

Examples of Recent Accomplishments

During fiscal year 1965, the following revegetation, plant control and other land treatment accomplishments were achieved by use of Federal funds and contributions by National Forest and National Grassland range users:

<u>Item</u>	<u>Total Accomplishment</u> (Acres)
Revegetation seeding	68,778
Plant control (seeded)*	31,162
Plant control (not seeded)*	117,902
Poison plant control	1,489
Noxious farm weed control	5,546
Rodent control	7,149
Water spreading	1,960
Other**	3,611

*For a higher quality forage plant production.

**Browse planting, fertilization, prescribed burning, range pitting, etc.

It is anticipated that 1966 accomplishments will be about the same.



Depleted rangeland which has been invaded by vegetation (Wyethia) which is undesirable from the standpoint of aesthetics, watershed, wildlife and economic use.

The same area shown above one year after spraying to control the undesirable vegetation. The value of the area for all uses has been improved. The adjacent mountain brush type was not sprayed because of its value for big game and other uses.



Figure F-1

(c) Range Improvements \$3,395,000

An increase of \$16,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Grazing resources within the National Forests and National Grasslands are being administered for sustained forage and livestock production consistent with other land uses. Intensive methods of range and livestock management are being implemented, including deferment of use in the spring and rotation of livestock between different parts of the range. These range management practices require development of physical structures such as fences and animal watering places. (See Figure G-1.)

Funds requested will be used to construct range improvement facilities. However, they will not adequately provide for all construction needs or for necessary maintenance of the existing 54,000 miles of fence and 38,000 watering places as a part of sustaining proper resource use and protecting present investments. Additional watering places, fence construction and other necessary range improvements are needed to gain control and management of livestock grazed by disadvantaged and minority groups in the South, and by farm families in other rural communities throughout the Nation. Range fences, aesthetically constructed where necessary to enhance the beauty of pastoral landscapes frequented by recreationists, would provide for proper livestock management.

Examples of Recent Accomplishments

Significant progress has been made in our range improvement program with the funds made available for this work. During fiscal year 1965, the following range improvements were constructed with funds appropriated for the work, and with contributions by grazing users:

<u>Item</u>	<u>Total Accomplishment</u>
Fences (miles)	1,786
Cattleguards (number)	265
Spring developments (number)	686
Ponds and reservoirs (number)	1,135
Wells (number)	123
Stock driveways (miles)	109
Corrals (number)	55

Approximately 28% of the funds were expended for maintenance of the existing fences and watering places, and grazing users contributed an estimated one-quarter million dollars in addition for this important work.

When related to the need, improvement work has not been at high enough levels to meet the planned range improvement program, and additional range improvement needs that are resulting from accumulated information obtained from range analysis. Funds have been inadequate to finance the necessary construction and maintenance of improvement work, even when the excellent cooperative efforts of the grazing users are added.



Properly managed National Forest and National Grassland range with good fences and watering places preserve the scenic values of the pastoral landscape, while providing forage for livestock.

Figure G-1

(5) Soil and Water Management \$6,261,000

An increase of \$539,000 is needed for the following purposes:

- (a) \$510,000 to meet increased demands for scientific management of municipal supply and other high value National Forest watersheds, to provide the water required for National Forest multiple use programs, and to maintain the program of water quality improvement through restoration of surface disturbed areas.
- (b) \$29,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Soil and water funds are used to conduct a watershed management program concerned primarily with inventory, protection, and management of the soil and water resources within the National Forest System.

The soils program is based on a program of standard soil surveys to provide the information needed to gear resource and development activities to the capability of the wide variety of soils found in National Forest areas. These surveys are fully coordinated with and become a part of the National Cooperative Soil Survey being conducted by the Soil Conservation Service. The standard survey is supplemented by reconnaissance level surveys to meet selected management needs over large areas. A soil management service provides localized soils information for a specific project such as selection of a nursery site, locating roads through fragile soil mantles or designing a watershed rehabilitation project.

The water resource program is concerned with preventing or correcting water pollution, providing the water necessary for attainment of National Forest purposes, and increasing the amount and usability of water flowing from National Forest land to serve the needs of dependent domestic, agricultural, and industrial water users. Hydrologic surveys and analyses are made on selected watersheds as a basis for prescriptions which will increase the quantity or improve the timing of National Forest water yields. A system of Barometer watersheds is being established as a means of adapting research findings to operational water yield improvement programs and to serve as a sampling system to establish the interrelationship of resource management and development practices on the quantity and quality of water yields. Specialized surveys and restoration plans are made for deteriorated watersheds as a preliminary to watershed restoration work. Watershed restoration is done to halt accelerated erosion, restore site productivity, and to improve water quality. Individual operations such as timber harvest areas, roads, mining operation, and recreation areas are studied by watershed scientists to make sure these activities are conducted in a manner to prevent serious erosion or deterioration of water resource values.

Examples of Recent Accomplishments

Hydrologic survey and analysis. Hydrologic surveys and analyses provide the basis for development of prescriptions for scientific, positive management of water as a resource. The ultimate watershed plan provides for maintaining or increasing water yield, maintaining or improving water quality, and as needed, improving the timing of water yield. (See Figure H-1.)

Project (5)

During the last complete fiscal year, watershed surveys and analyses were completed on individual watersheds covering about 2.9 million acres of National Forest land by 57 watershed scientists working on 39 National Forests. In addition, these same scientists completed watershed surveys for specific purposes -- such as rehabilitation needs -- on about 2.6 million acres. Accomplishment of detailed surveys and analyses represents about 4.3% of the total need.

Soil surveys. Standard soil surveys were completed on 2.2 million acres during fiscal year 1965. Reconnaissance surveys for specific purposes covered 1.5 million acres.

Information provided by soil surveys is perhaps the most basic and valuable information the land administrator can have in assuring maximum coordination of resource uses and activities and minimum adverse effects of activities causing soil disturbance. Increasing public demand for National Forest benefits clearly dictates the urgency of obtaining the basic information necessary for wise, foresighted management.

Preventing watershed damage. During fiscal year 1965 technical watershed protection specifications were prepared for over 347 projects. These specifications were based upon the scientific efforts of both soils and watershed scientists. They provided the basis for coordinating expanding activities such as road and highway construction, timber harvesting, mining, and recreation construction with water and soil values -- thus assuring maximum benefits with minimum chance of water pollution or damage to watersheds.

Water quality and yield improvement. Emphasis continues to be given to the development and execution of watershed management plans to increase quantity and improve quality of water produced by the National Forests.

During fiscal year 1965, 17 additional watershed scientists were assigned to National Forests to accelerate this important effort. During this same year, prescriptions and plans to increase quantity and/or improve quality of water were completed for six additional watersheds. Prescriptions developed include such measures as cutting of timber in a pattern that will increase snow pack and increase water yield; using snow fence for the same purpose; converting aspen and/or brush to grass to decrease on-site use and increase water yield; and, rehabilitation to reduce sediment and improve timing of flow.

Of particular significance during fiscal year 1966 was the initiation of a joint Forest Service-Public Health Service study to determine the effects of activities such as timber harvesting and public recreation upon water quality. Watersheds involved are the Green and Cedar Rivers in Washington and the Clackamas in Oregon. Findings of this joint study will be most important in guiding future management of National Forest watersheds that supply water to municipalities.

Hydrologic restoration. Watershed rehabilitation work during the last complete fiscal year was undertaken on those areas where site deterioration and sediment production was most serious. It included 30,280 acres of sheet and gully erosion control; 56 miles of streambank and shoreline stabilization; 226 miles of stream channel clearing; 2,282 miles of erosion control on abandoned roads and trails; and, 86 acres of mine spoils and waste stabilization. In addition, 139,349 acres of burned-over area was treated to prevent site deterioration.

During fiscal year 1966, an accelerated program of watershed restoration was undertaken in the Appalachian area. Important rehabilitation work based upon needs as determined by watershed analysis was accomplished on nineteen watersheds on eight National Forests. Accomplishment to date represents only a small part of the need, but it is an important step toward achieving water quality in the Appalachian area.

SOIL AND WATER MANAGEMENT



BEFORE TREATMENT



AFTER TREATMENT

Soil and watershed surveys and analyses provide the bases for watershed management plans which prescribe treatment necessary to reestablish site stability and improve water quality.

Figure H- 1

(6) Mineral Claims, Leases, and Special Uses \$4,004,000

An increase of \$28,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

This program provides for supervision, administration, regulation and control of the special land uses and mineral disposal on National Forest lands.

The work involves mineral examination of mining claims included in patent applications and occupancy trespass action, determination of surface rights under PL 84-167, mineral leasing, mineral reservation and outstanding rights administration, and special uses (other than recreation). Occupancy and use of National Forest land for development and disposal of minerals are necessary and desirable as a part of sound multiple use management. However, strict and adequate control of occupancy and mineral operations is necessary to protect forest resources from damage and to assure the highest use of the land consistent with good management of all other resources.

Mineral examination of applications for patents for mining claims must be kept current. The detection and elimination of unauthorized use of mining claims which constitutes trespass and interferes with the orderly administration of the National Forests is an important activity and must be aggressively handled. Approximately 5,300 cases of occupancy occurring on mining claims should be reviewed within the next seven years to determine whether the use being made of the claim is authorized under the mining laws. These occupancies include all types of residential use (permanent, seasonal, and transient) where a cabin or similar structure exists on a mining claim. Failure to aggressively pursue such cases further complicates the problem, as it encourages disregard of the mining laws. The Church-Johnson Act (PL 87-851) for the relief of mining claimants has also increased the mineral examination and occupancy activity on mining claims.

There are close to 17,500 active mineral permits and leases in force, covering several million acres of land. Rentals and royalties are in excess of \$16 million per year. The work must be kept current to protect the public's interest. Between 7,000 and 7,300 mineral applications must be reviewed comprehensively and processed annually. The volume of mineral leases has steadily increased from 5,200 in 1951 to an estimated 17,500 in 1966. In addition, some 140 mineral reservations are being actively operated, covering 98,000 acres on which the owner retained the mineral rights when the land was purchased by the Government. The public values in the surface of the land must be fully protected.

Recently developed electric generating plants using coal along with new methods of mining have caused a big increase in coal mining operations. New methods of processing and upgrading of iron ore and taconite will make economic the removal of many low-grade deposits. These factors have caused a step-up in leasing and in the mining of privately owned minerals under lands acquired by the Forest Service. Much of this activity is in areas now experiencing economic depressions where underground coal and iron mining have steadily declined with a resulting decrease in employment. Development of the mineral resource is important in providing livelihood and bringing about an expanded economy in these areas.

Project (6)

Advanced technology and modernization of mining machinery now permits mineral exploration and development on many areas and for many deposits not formerly considered operable. An estimated 300,000 acres of National Forest and National Grassland in the Idaho-Utah-Wyoming area are underlain with phosphate. Geologic faulting makes surface mining the only practicable method to remove many of these deposits. An estimated 25 to 40 thousand acres may be involved.

Adequate control must be maintained over exploration and development under mineral lease and necessary guidance and assistance given operators under mineral reservations and outstanding rights to protect the other forest resources, such as water, recreation, and timber; to provide for their effective utilization; and to restore mined lands to productivity for surface management, resource development, and use.

Special use permits (other than recreation) for the use of National Forest lands have increased. There are approximately 37,100 permits and easements covering 4,700,000 acres of land and 56,000 miles of rights-of-way. These permits must be properly supervised and failure to administer them could result in serious damage to the National Forests and a direct monetary loss to the Government.

Competition for television, radio-electronic, and similar uses for sites continues to increase. These uses require mountain peaks for advantageous coverage and many of these sites occur in the National Forests.

Examples of Recent Accomplishments

Mining claims. The Act of July 23, 1955 (PL 84-167) provided a procedure including the examination of National Forest lands to enable the Forest Service to manage the surface resources on mining claims. The work required on-the-ground examination of 1,109,908 claims, on 144,805,230 acres. The claimants of 21,019 of these claims asserted their rights to manage the surface as well as extract the minerals (about 420,000 acres), but thus far the Government has recognized the validity of their claims in but 1,985 cases. Only about 1,000 claims are yet to be examined and it is believed when this is completed the Government will have the right to manage the surface resource on all but about 3,000 of the original 1,109,908 claims. A complex and difficult task is now 95% complete.

Occupancy trespass on mining claims. The field examinations above made for the determination of surface rights showed a total of 5,271 residential-type structures on mining claims. It is estimated that 3,891 or 74% of these are in trespass because they are being used for purposes not authorized by the mining laws. Actions have been completed clearing up 804 of these cases and have been started on an additional 773 cases. This is a most important activity, for such unauthorized occupancies are serious sources of administrative problems and their prompt control is the only means of reducing a serious workload; of siphoning the time of resource managers from urgently needed resource activities. It must be pushed aggressively. (See Figure I-1.)

Mineral leasing and permits. There are 17,500 mineral leases and permits on 16-1/4 million acres within the National Forest System. On-the-ground supervision of the establishment and operation of these leases is required if the soil and vegetation is to be maintained productive concurrent with or following the mineral extraction. Site rehabilitation by the lessee must be enforced after the extraction is completed. Persuasive, on-the-ground contacts between operator and forest officers to obtain compliance are frequently required to safeguard streams and otherwise protect the public interest. (See Figure I-2.)

Mining and prospecting permits issued and administered by the Forest Service directly during fiscal year 1966 covered over .5 million acres and 10,000 miles of seismograph strips. Included were some 1,040 permits for common varieties of mineral materials, highway construction, over 1,050 borrow pits for highways and construction purposes and seismographic operations. Many of these materials necessary to commerce, industry, and transportation can only be removed by stripping, quarrying, and open-pit methods.

Total revenues from mineral leasing, and oil and gas exploration and development on the National Grasslands and National Forests, primarily from acquired lands, amounted to \$4,336,000 for fiscal year 1965. Additionally, an estimated \$16 to \$17 million in revenues were received from rents and royalties for such leases on lands reserved from the public domain. The counties share in such revenues.

A new procedure for processing oil and gas lease applications was put into effect last year on two Utah National Forests. In twelve months an additional revenue of \$26,000 has been obtained through earlier processing and leasing. The procedure is being extended to other forests in the Intermountain Region with an estimated saving of 5,000 man-hours and \$20,000.

Last year it was reported that there is an estimated 300,000 acres of National Forest and National Grassland in the Idaho-Utah-Wyoming area underlain with phosphate with removal by surface mining, the only practicable means of recovery. Studies are needed to determine how this can be accomplished without permanently devastating the area. Two large phosphate producing companies have offered to cooperate with Federal agencies in research and restoration of strip mine areas and waste dumps. Work is expected to begin this year under the direction of the University of Idaho.

Work has been completed on two forests in the Eastern Region to determine United States ownership in minerals in acquired lands and is progressing on three others. In the North Central Region the mineral inventory work has been completed on 414,000 acres in the Huron National Forest and 16,600 in the Manistee. Since abstracting of mineral titles was not required with purchase, in both regions this work has resulted in knowledge of ownership in the United States in minerals which was not known before. The knowledge will in time result in significantly increased revenues to the United States both in surface and subsurface uses.

Project (6)

The addition of geologists to some National Forest staffs in the Eastern and Southern Regions has enabled a much more current screening and processing of mineral lease applications resulting in increased revenues and appreciably better public service. For instance, it has resulted in reducing the review and report time from eight to two weeks.

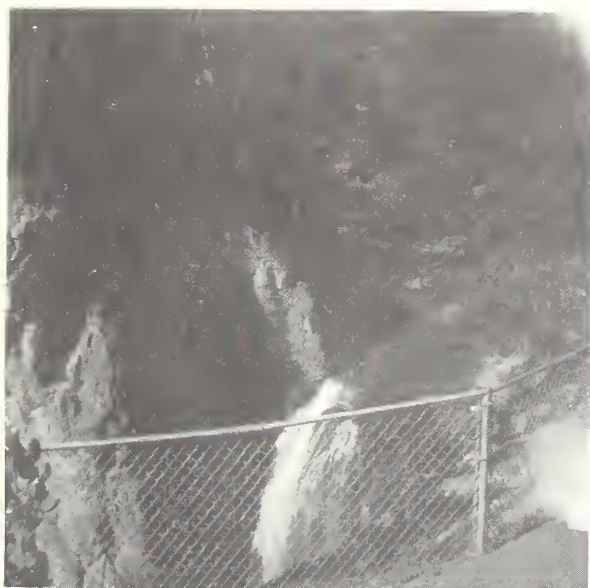
Special uses. National Forest land and other land administered by the Forest Service may be used for special purposes when such uses are in the public interest. About 38,000 special use permits covering 51 different purposes such as archaeological research, hay cutting, electronic installations, reservoirs, water supplies, and many other desirable uses are now in effect. Fiscal year 1965 receipts for special land uses were:

Power	\$88,306
Other land uses, not associated with recreation	<u>510,149</u>
Total	598,455

This is an increase of \$48,611 over the previous year.



Cabin and cableway used by claimant to to quarry stone adjacent to waterfall in canyon. Claim was contested and declared null and void. Area was then developed as a roadside picnic site.



Scenic view of falls from the picnic site which was developed after the claim was voided.



Roadside picnic site overlooking falls in canyon.



Kisatchie National Forest, Louisiana

Drilling rig on exploration hole in dense forest cover. Proper supervision by forest officers is necessary to avoid unnecessary damage to roads in bad weather, regulate cross-country hauling resulting in erosion, and require restoration.



This photograph shows a producing well at Lake McClellan on the Panhandle National Grasslands, Texas. This lake is heavily used for recreation purposes.

(7) Land Classification, Adjustments, and Surveys \$5,805,000

An increase of \$1,460,000 is needed for the following purposes:

- (a) \$1,429,000 to accelerate examination and appraisal of lands involved in exchange transactions for consolidating lands administered by Forest Service; to provide for a more efficient land ownership and status record for land protection and use control; to provide for more timely land line location and marking to facilitate management and reduce time-consuming and costly losses in connection with trespass; to study and classify lands with respect to their suitability for inclusion or exclusion from the National Forests, National Grasslands, and other land areas administered by the Forest Service and carry out resultant programs; to accelerate procurement of mapping aerial photography and the production, field checking, and compilation of map manuscripts.
- (b) \$31,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

This program provides for the study and classification of lands as to their suitability for inclusion or exclusion from the National Forests, National Grasslands, and other land areas administered by the Forest Service; adjustments of land ownership in these areas through exchange, donation, purchase, and transfer; establishment of property lines; maintenance of accurate ownership and status records for all lands administered by the Forest Service and the reproduction of essential administrative maps. These functions are basic to the Forest Service land management program. Ownership patterns are a first consideration in planning and installing improvements and land treatment measures and in carrying out protection work.

Land classification. Accomplished on a soundly planned basis, major additions to lands subject to National Forest programs and refinements of boundaries of existing National Forest units tie in directly with effective and economical public programs for improved rural economies, increased forest resources, reduced stream pollution, adequate outdoor recreation space, and maintenance or enhancement of the scenic and aesthetic values of rural lands. The land classification function is to analyze and report upon resource suitabilities, opportunities, needs, and feasibilities for National Forest programs and to recommend suitable action programs. It will be increasingly called upon and affected by the Congress' objectives for Appalachia, by population pressures on lands and changes in land uses which may justify extensions or modifications of the National Forest System, by programs for enhancement of rural resources, and by potentials afforded for public land use in the termination of military reservations. Major reservoir construction programs that have or will result in new public recreation opportunities adjacent to National Forest units and rapidly changing situations with respect to transportation and public desires require analysis of opportunities to obtain more effective and economical administration of public resource management programs through adjustments of land ownership or jurisdiction.

Project (7)

The proposed increase includes \$20,000 for this function to be used to explore the need and desirability of larger National Forest programs in the Appalachian regions, including the Potomac Basin, the Ozark region and in the northern Lake States; for accelerated interagency transfer programs at water resource developments and in the public domain to increase public land management efficiency; for more intensified planning of land acquisition and disposal programs in National Forests for greater effectiveness of operations; and for intensive review of the location and extent of existing National Forest System units.

Examples of Recent Accomplishments

Recent analyses have resulted in establishment of a new National Forest unit in the highlands of eastern Kentucky as part of the program for Appalachia. National Forest programs here will reduce potentials for recurrence of disastrous floods, provide for ultimate restoration of a valuable timber resource, develop facilities and access that attract tourists and sportsmen, and offer concurrent new opportunities for public and private employment in an area having chronic economic troubles. Comparable studies in recent years have recommended or advised against suggested additions to the National Forest System in West Virginia.

A study of National Forest potentials in several million acres of degraded forest and depleted cleared lands in northwestern Arkansas where economic conditions also are at low level, requested by members of local Congressional Delegations, has recently been completed. An intensive investigation is being made jointly with the National Park Service, Department of the Interior, to recommend the best public use and logical jurisdiction of some half million acres in the Sawtooth Range area of Idaho, now part of the National Forest. This results from a legislative proposal that multiple use National Forest lands be converted to single use National Park purposes. Interagency studies with the Bureau of Land Management have brought agreement on actions to consolidate intermingled land jurisdictions in Montana and Colorado to facilitate management and administrative efficiency. There is need to extend these studies. Actions following careful analyses have resulted in avoidance of duplicating administrations of public recreational lands adjacent to and extending out from major reservoirs. The Allegheny Reservoir in Pennsylvania is an example. Programs underway or recently accomplished resulted in determinations of desirable lands and jurisdictions for proposed National Recreation Areas in California, Utah, and West Virginia. They are a forerunner of increasing work to be required in connection with multimillion dollar water storage projects.

Land Exchange and Ownership Adjustments

- (a) Land exchange. An urgent need exists for a crash program to increase Forest Service land exchanges with adjoining State, county, and private landowners. Significant short-range and long-range cost avoidance in managing the multiple resources of the National Forest System will result. The using public will materially benefit from consolidation exchanges which provide access for timber harvest, new recreation development areas, opening of additional lands for hunting and fishing, and better protection of key and critical watersheds.

Selected examples of estimated cost avoidance that will result during the next ten years from the fiscal year 1965 exchange program are:

	<u>Units</u>	<u>Estimated Cost Avoidance, 10 Years</u>
1. Reduction of property lines and corners	1,028 miles	\$1,215,680
2. Reduction in road construction needs	105 miles	3,150,000
3. Reduction in road rights- of-way needed	252 cases	169,000
4. Reduction in use permits and occupancy trespass	156 cases	<u>600,000</u>
Total		5,134,680

Material increases in income receipts to the United States Treasury can result through well-designed exchanges. The solving of long-standing problems of road access can make heretofore inaccessible mature timber stands available for harvest to the mutual benefit of the United States and operating timber companies in need of increased log supplies. For example, a large land exchange (approved in fiscal year 1964) in California, now nearing completion, makes available sawtimber worth over \$6,000,000. As a part of this exchange, conveyances of interests in the privately owned road system serving the area was negotiated, as was a donation of key recreation lands covering 50% of the shoreline of a major reservoir having high value for recreation purposes. This same land exchange decreases property lines in need of location and maintenance by 215 miles with an immediate cost avoidance of \$150,000, and reduced multiple use road development costs by \$2,000,000.

Figure J-2 shows the ownership pattern "before" and "after" one major land exchange approved and completed in fiscal year 1965. Each full square on the map represents one square mile (640 acres) on the ground. In this exchange, the United States receives 6,901 acres in return for 4,838 acres having substantially equal value.

Following is the work planned with the 1967 budget as proposed:

Examine lands for exchange (450,000 acres
offered; 400,000 acres selected) 850,000 acres

Complete land exchange appraisals and
negotiations (275,000 acres offered;
275,000 acres selected) 550,000 acres

- (b) Land status records. An increase is needed to reduce the period of time estimated to complete the job of providing accurate up-to-date land status records. Work to date is continuing to unearth significant errors in old records and land ownership. The proposed rate of financing projected through fiscal year 1970 should make it possible to have the job 50% finished at that time.

Project (7)

The conversion of existing status records consists of: (1) accurately compiling basic information on ownerships, title encumbrances, and restrictions on use of the land in the 17,000 townships (nearly 226 million gross acres) in the National Forest System; (2) producing usable status records for the 1,100 field units managing the Government lands and interests in other lands within the System; and (3) currently maintaining these records. These jobs are performed by a central status unit in each of the ten regional offices. With status records on which they can rely, Forest Service land managers can confidently make multiple use decisions, and Government ownership can be asserted without injustice to others.

With the proposed budget, we would expect to complete 1,650 townships in fiscal year 1967. This will result in having completed status records for approximately 38 National Forest or National Grassland units and ten smaller units since work began in 1962.

Examples of Recent Accomplishments

The following shows how this project continues to identify many parcels and general areas which have previously been misunderstood, identified inaccurately, or overlooked in administration. As a result of current work, claims and encroachment problems are revealed. Potential ones can be prevented. Confidence in administration of lands of the United States is enhanced.

1. The new accurate status records reveal a gross increase of 14,000 acres in the Pike National Forest in Colorado, of which 11,700 acres are owned by the United States. On the Deerlodge National Forest in Montana, an increase of over 26,000 acres in Government ownership is revealed. Lesser differences are being revealed on other National Forests. These differences from the previous inadequate records are being revealed by the high efficiency of the new system wherein there is thorough review and compilation of all public records, and current maintenance in a highly skilled small centralized unit in each Forest Service region.
2. Under previous inadequate ownership records, a party cut and removed some \$80,000 worth of Government timber in the Mt. Hood National Forest in Oregon. The status unit uncovered the true ownership situation and action has been initiated by the United States to recover the value of this timber.
3. The status plats prepared in this project are most welcome to forest rangers and supervisors. These give detailed large-scale information on dependent resurveyed areas and on complex mining claim areas. These composite plats are sorely needed to protect the interests of the United States and to cooperate with associated landowners in meeting the heavy demand for use of lands within the National Forests.

4. The Northern Region status unit discovered that there was unsettled ownership of mineral rights due to delinquent tax and protection cost problems on 100,000 acres of north Idaho lands donated to the United States years ago. The assembled records produced legal review and satisfactory settlement. Similarly, the North Central status unit revealed that a railroad company holds mineral rights on over 100,000 acres of lands of the United States in the Nicolet National Forest in Wisconsin and similar interests in other National Forests in the Lake States. Negotiations are under way to either merge the interests or to recognize them in management of the surface and exploitation of minerals.

- (c) Land line location. Corner markers on property boundaries between Forest Service administered lands and lands of others are disappearing at the rate of 10,000 annually because of the ravages of time and lack of maintenance. Over 1,100,000 corners marking some 280 thousand miles of property line are involved. Current financing is barely adequate to keep up with losses. The result is that the Forest Service is faced with a 25- to 35-year project and the expense of resolving over 100 land claims and apparent trespass cases annually. The proposed financing is a forward step in accelerating vital land line location work. Projected through fiscal year 1970, it should be possible to complete 12% of the job by that time.

Prior to fiscal year 1958 there was no provision for project maintenance of property corner markers and property lines. Funds were made available in fiscal year 1958 to begin this work. The job is five-fold: (1) a search for all property corners to determine their existence and condition; (2) verification of found corners as the true markers based on original survey notes, and remonumentation of those in unsatisfactory condition; (3) cadastral surveys to install markers in their true position when no corners are found or evidence is unsatisfactory; (4) marking and posting the property line between authentic corner markers; and (5) perpetuating the markers and maintaining the posted lines.

The Bureau of Land Management (BLM) is responsible for verification, remonumentation, and needed cadastral surveys on 160 million acres of public domain administered by the Forest Service. This involves 780,000 corners. As a part of their regular program, BLM has annually furnished some services for this work. However, Forest Service corner search activities are revealing that 40-50% of the corners on these reserved public domain lands have been lost. Remonumentation requires cadastral surveys. Because of this high loss, \$250,000 in additional funds was appropriated in fiscal year 1966 to the Forest Service for transfer to the BLM to supplement their regular services and accelerate this work. The fiscal year 1967 budget request for this work, as a part of the regular appropriation, is \$275,000 to continue efforts to reduce losses and effect significant savings to the Government.

Project (7)

Cadastral survey and remonumentation work on the 26 million acres of acquired Government land in the National Forest System is performed by State-licensed surveyors. They are paid from appropriated funds. The increase requested for fiscal year 1967 will also assure continuation of Forest Service efforts on acquired land in corner search, remonumentation, cadastral surveys, and marking and posting.

Work proposed for fiscal year 1967:

Field search for property corners	26,000
Corners monumented or remonumented	12,000*
Identify, survey, and post land lines (miles)	1,500
Maintain land lines (miles)	1,500

*8,500 of these corners are on land reserved from the Public Domain where it is the function of the Bureau of Land Management to do the actual monumenting. This is done with assistance of the Forest Service.

It is estimated that during calendar year 1965 field search will be made for 21,000 corners and 8,000 corners will be monumented or remonumented.

Examples of Recent Accomplishments

<u>Land Line Location Program Accomplishments</u>	<u>CY 1964</u>	<u>Totals to Date</u>
1. Field search for land survey corners	21,700	106,000
a. No. of corners found with acceptable evidence remaining	14,600	53,800
b. No. of corners on which all evidence has disappeared	7,100	52,200
c. No. of corners monumented	13,500	45,400
2. Miles of property lines marked and posted to standard	1,200	6,500
3. Miles of property lines marked and posted to interim standards	1,900	22,100
4. Miles of marked and posted property lines maintained	1,000	8,000

It costs approximately \$60.00 per corner for search and remonumentation where there is remaining acceptable evidence.

It costs approximately \$600.00 per corner to reestablish a corner by survey after all evidence is lost.

Costs Avoided by the Land Line Location Program

Amount saved by timely corner recovery and remonumentation:

Saved in 1964 (13,500 corners monumented x \$600)	\$8,100,000
Saved since start of program (45,400 corners x \$600)	27,240,000

Another important gain, even though it is difficult to evaluate in dollars and cents, is the obvious benefit derived from accurately located and plainly marked property lines.

An adequate land line location program would be far less costly to the Government than the lost time, uncertainty, conflicts, litigation, loss of good will, unfavorable press coverage, and managerial blunders that are so frequently generated by inaccurate or poorly defined property boundaries. (See Figure J-1.)

Mapping

Adequate maps are essential for multiple use planning and for the special recordation of resource information. Accurate contour maps are of great value in planning transportation systems and planning timber sales. At present contour maps adequate for these uses are available on only 41% of the approximately 617,000 square miles in the National Forest System. (See Figure J-3.) It is necessary that the Forest Service maintain a mapping program to meet Forest Service priorities for use.

Reliable planimetric maps meeting the requirements for accelerated management activities are now available for about 56% of total requirements for administering the National Forests and Grasslands. General purpose maps are available for approximately 46%.

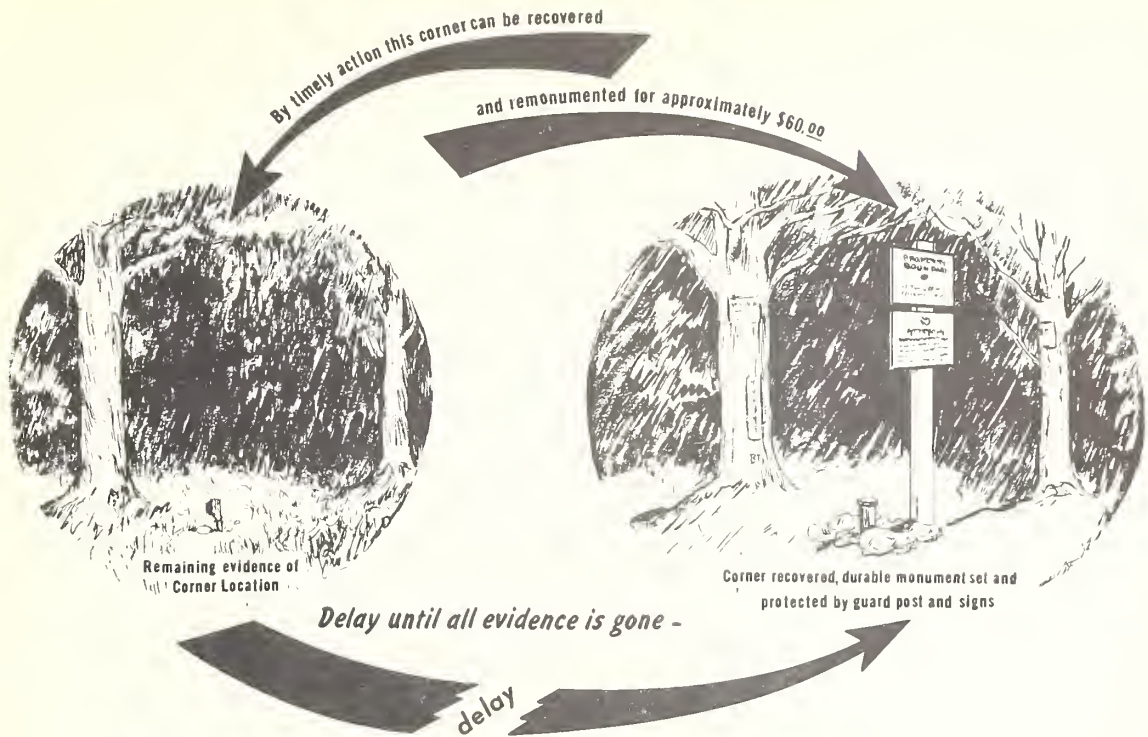
The funds requested for fiscal year 1967 are needed to procure mapping aerial photography, establish horizontal and vertical control, and produce map manuscripts for an equivalent of 3,800 square miles of contour maps; produce and make field checks of map manuscripts for an equivalent of 13,000 square miles of planimetric maps; and compile map manuscripts for photographic reproduction of 15 forest maps to a scale of one-half inch equals one mile.

Examples of Recent Accomplishments

During fiscal year 1965, contour map manuscripts were completed for 2,117 square miles. Work accomplished on contour mapping for an additional area was equivalent to completion of another 1,600 square miles. Planimetric mapping was completed for 13,000 square miles and is from 50 to 90% complete for an additional 5,000 square miles. Eighteen general purpose maps of National Forests were produced.

Fiscal year 1966 estimated accomplishments are: 2,200 square miles of contour map manuscripts completed and an additional work equivalency of 1,600 square miles; 15,000 square miles of planimetric mapping completed and more than half completed on an additional 3,000 square miles; produce 15 National Forest maps.

\$60.00 for prevention Now or \$600.00+ for cure later?



and surveys to reestablish this corner will cost approximately \$600.00

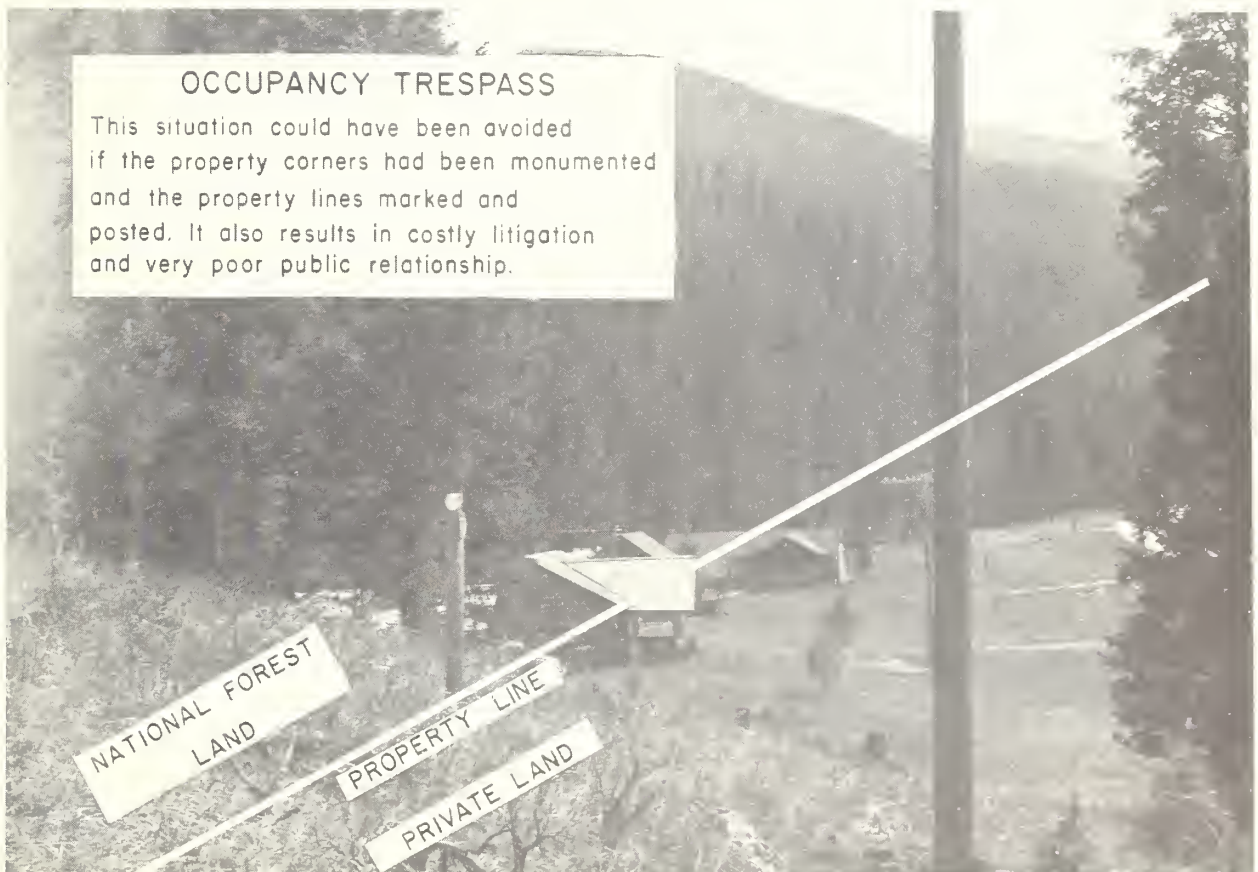


Figure J-1

LAND EXCHANGE – A MAJOR COST SAVING TOOL

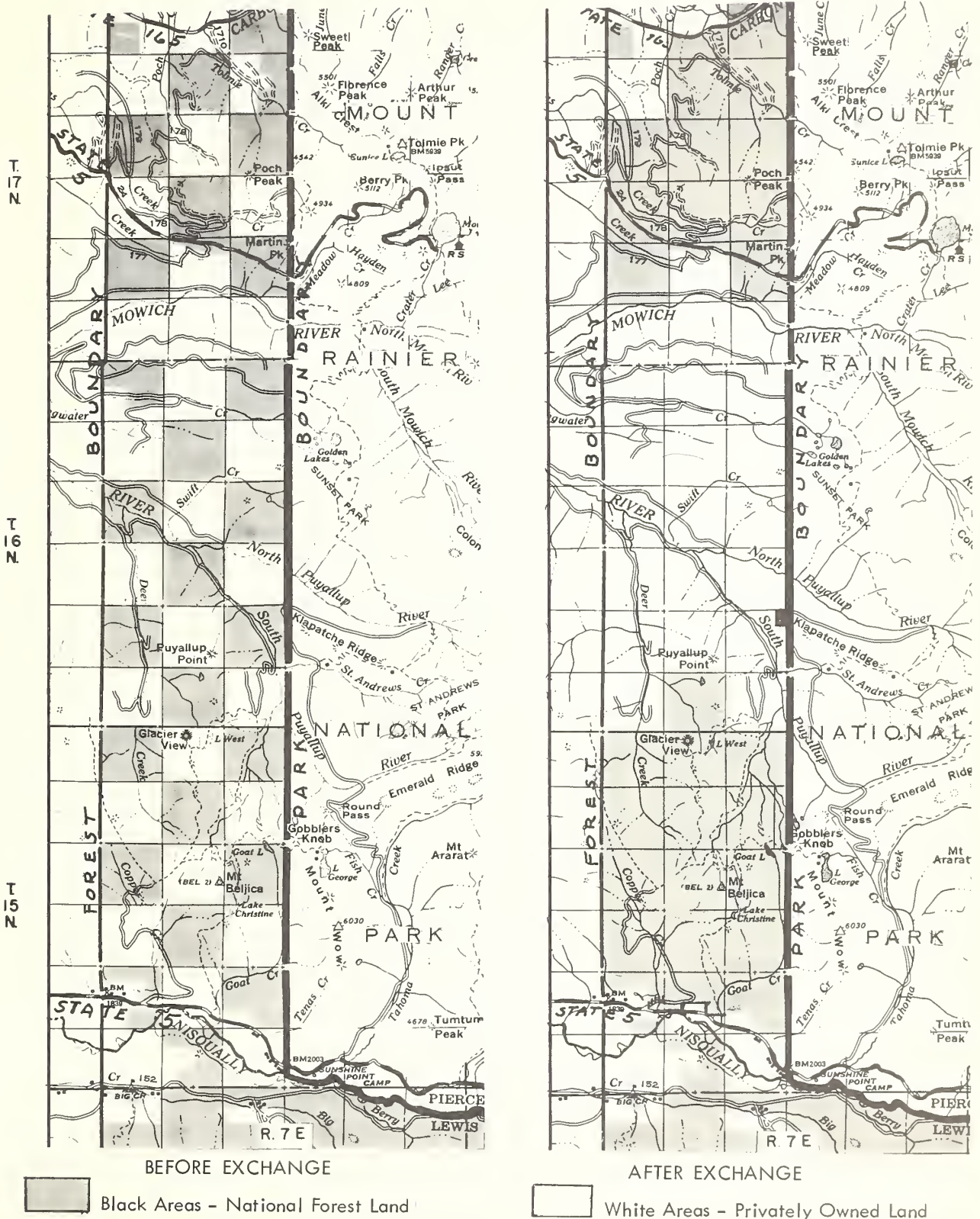
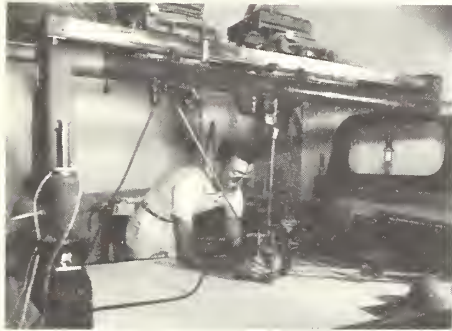
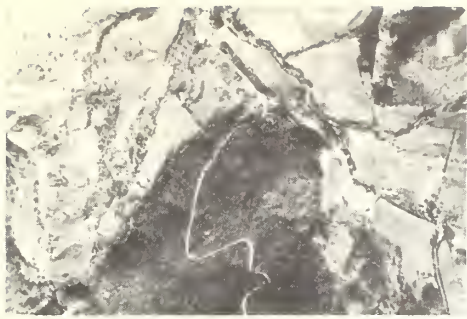
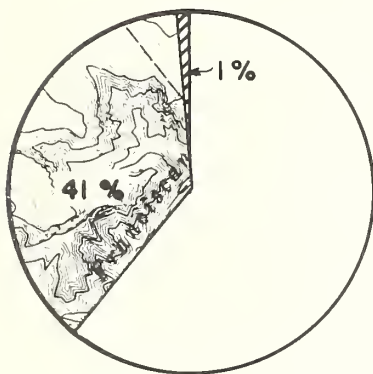


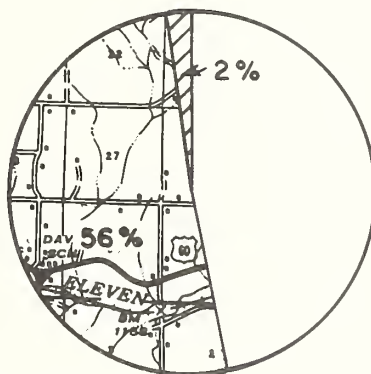
Figure J-2



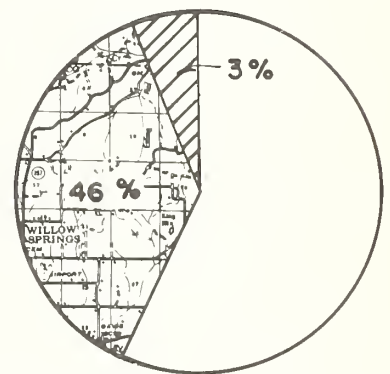
Aerial photographs, controlled by field surveys, are used in stereoscopic plotting instruments to photogrammetrically produce a contour map manuscript. This manuscript is used in the preparation of the published contour map essential to resource management plans.



CONTOUR MAPPING
617,000 Sq. Mi.



PLANIMETRIC MAPPING
795,000 Sq. Mi.



FORESTS & GRASSLAND
MAPS - 267

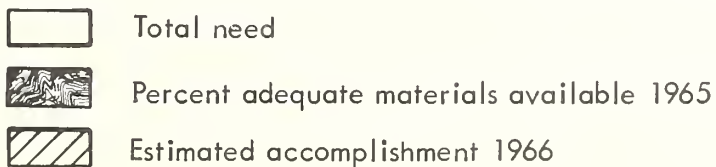


Figure J-3

(8) Forest Fire Protection \$25,120,000

An increase of \$666,000 is needed for the following purposes:

- (a) \$516,000 to stabilize the air attack program.
- (b) \$150,000 for increased pay act costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Air Operations \$516,000

Aircraft continues to provide one of the best means for prompt and effective initial fire attack. Most of the aircraft are obtained from contract operators. Increased funds will be used to assure availability of services from commercial operators as required and to stabilize initial air attack operations. This will include seasonal guarantees for aerial attack. There is need to speed up development and testing of new techniques in air detection and suppression for increased effectiveness.

Wildfire running through the forest or grassland causes serious damage and destruction. Property losses are immediate and readily apparent. Loss of timber, recreation areas, homes, and range improvements amount to many millions of dollars each year. Loss of human life and pain and suffering from wildfires defy measurement in terms of dollars and cents. Not so easy to see and measure are the indirect effects from wildfire. The planned orderly management of the National Forests and Grasslands is upset by the occurrence of wildfire. Local economies may be thrown out of balance for years. Panoramic views of natural beauty may not be restored for generations - if at all. Fire scars in vital watershed areas adversely affect water quality for years. In addition, millions of dollars are spent each year for fire suppression.

The overall objective of fire control is to hold fire losses (cost plus damage) to a level commensurate with values protected. This important job must be done efficiently, economically, and safely. The Forest Service completed a periodic review of its fire control plans in 1965. Current data were used to determine management objectives, reassess resource values and inventory fire risk hazards. Current techniques in air attack, new equipment and accessories, and other state of the art capabilities were considered in determining needs of adequate fire protection. General findings of the review show resource values are rising, man-caused fires are increasing, and management objectives require fire control objectives to be more stringent than ever before. Fire protection must be strengthened to meet this impact.

Examples of Recent Accomplishments

Fire training. Fire control simulators are being used extensively to train forest officers to handle complex fire situations. Simulation provides a real-life atmosphere to the training and through

Project (8)

this training men are capable of fire command at a time when actual fires are not always available to train by experience. (See Figure K-1, center.) New simulators are designed for greater portability in order to reach more first-line firemen with this training at their duty stations. A new programed text on fire safety has been provided to firefighters and leaders to enable them to learn individually without the costs of group sessions. A National Air Operations School held during the year gave formal training to regional representatives who, in turn, are conducting local schools to improve efficiency of air support in the control of forest fires.

Fire prevention and fire law enforcement. Fire prevention activities continue to be emphasized. Man-caused fires have accounted for nearly 70% of the burned area on the National Forests during the past 10 years. In 1964 man-caused fires were responsible for 85% of the burned area. This is cause for much concern. Accelerated prevention projects have been set up where new and intensive prevention methods are being tested. Fire occurrence trends are definitely down on these areas compared to a somewhat upward trend nationwide. (See Figure K-1, top.)

Fires caused by exhaust sparks from equipment have also received special attention. A spark arrester guide, recently issued, will assist field men in inspecting for faulty units. A spark arrester inspection training film was made to acquaint field men with how to test to determine whether an arrester is adequate. Increasing rail shipments and aging diesel locomotives have caused an upswing in the number of railroad fires. Special efforts have been directed to get facts on exhaust spark elimination, treatment of fuels likely to catch on fire in railroad rights-of-way, and similar practices.

Fire law enforcement is an effective and recognized phase of fire prevention. It is a retardant, working somewhat like a chemical. It does not last indefinitely. There must be planned training and followup to keep enforcement effective. Stronger law enforcement has been initiated in all regions. Criminal investigators, added to assist with investigation of difficult fire cases by individual and team effort, have made an outstanding record. These men train others in the technical aspects of fire investigation and handle the more complicated cases directly.

Prompt attention and persistent followup on preparation of trespass cases have assured greater recovery of suppression costs and resource damages from those responsible for causing fires. Progress made in fiscal year 1965 compared to fiscal year 1964, based on cases submitted to the Washington Office, is shown in the following table:

<u>Fiscal Year</u>	<u>Cases Received</u>	<u>Cases Closed</u>	<u>Claim</u>	<u>Collection</u>
1964	40	18	\$1,574,438	\$201,182
1965	45	46	2,425,772	371,870

Authority was given to field offices in June 1965 to refer certain cases directly to Regional Attorneys of the Department of Agriculture. The Regional Attorney is authorized to refer these cases to the appropriate U.S. Attorney. Based on experience in 1964 it appears 40% of the cases previously referred to Washington will be handled by field offices. Use of the expanded direct reference authority will speed up case processing with the strong possibility of more favorable settlements to the Government.

Air attack progress. As the use of air tankers for dropping retardants to aid in the control of fires increased, certain contracting problems were encountered. The objectives of safe and effective air tanker use with a stabilized industry were depreciated by marginal operators. The Forest Service conducted a study of air tanker contracting procedures in 1964 and developed a new policy based on study findings. A new contract used in 1965 provides that special attention should be given to pilot experience and training, safety records and service facilities in the negotiation with operators. The higher requirements are expected to meet the objectives of safe, efficient air service and to stabilize the air tanker industry.

Extended hours of service from helicopters are in the realm of possibility based on night flying tests conducted in mountainous country. (See Figure K-1, bottom.) Night flying offers great possibilities to get firefighters on the fire line quickly and efficiently when they are needed most. Many field units have completed integrated plans for needed air facilities such as helispots and heliports which tie to plans for ground attack. This assures more efficient and economic firefighting.

Cooperation. Wildfires recognize no property lines or political boundaries. For effective fire control it is essential to have "good neighbor" policies at local, national, and international levels. The Forest Service recognizes this axiom and strives to use cooperative agreements wherever and whenever possible. There is a constant interchange of men and facilities with State and other Federal agencies having fire protection responsibilities. Air tankers and related facilities are expensive to operate and maintain.

Project (8)

To lessen this expense the Forest Service has developed an intertie of these facilities with the State Forestry Division in California and with the Bureau of Land Management in the Intermountain area. Several agencies of the Department of Interior and the Forest Service have developed a plan for interagency fire coordination during critical fire periods in the western States. This provides for timely and effective use of firefighting resources of those involved. At West Yellowstone, Montana, a joint interagency fire center is being built where smoke-jumpers, air tankers, and other special facilities managed by the Forest Service will be used by the Park Service, the Bureau of Land Management, and the Forest Service. Plans are under way to develop an interagency fire center for the Forest Service and Department of Interior agencies at Boise, Idaho.

Fire weather and fire danger rating. More attention is being given to fire weather changes and the communication of this information to field offices. The National Fire Danger Rating System developed by the Forest Service is being used in nearly all parts of the country. Through orientation and training of field men use of the system has increased with a resulting better application of preparedness arrangements and actual fire management. (See Figure K-2, top.)

Fire management. A strong campaign to cut firefighting costs is producing good results. The central theme of the campaign is to make every man a "watch dog" on costs. The expenditure record for fiscal year 1965 was less than expected in spite of a prolonged season in the West in the fall of 1964. Specifically air tanker use guides have been developed to give field men guidance on when and how to use this costly, but highly effective tool. More use has been made of Forest Service organized crews, rather than hiring "pickup" firefighters who tend to be costly and inefficient. Economies have been stressed in use of equipment and supplies. Job corpsmen will be used in behind-the-lines fire work as they become trained and available.

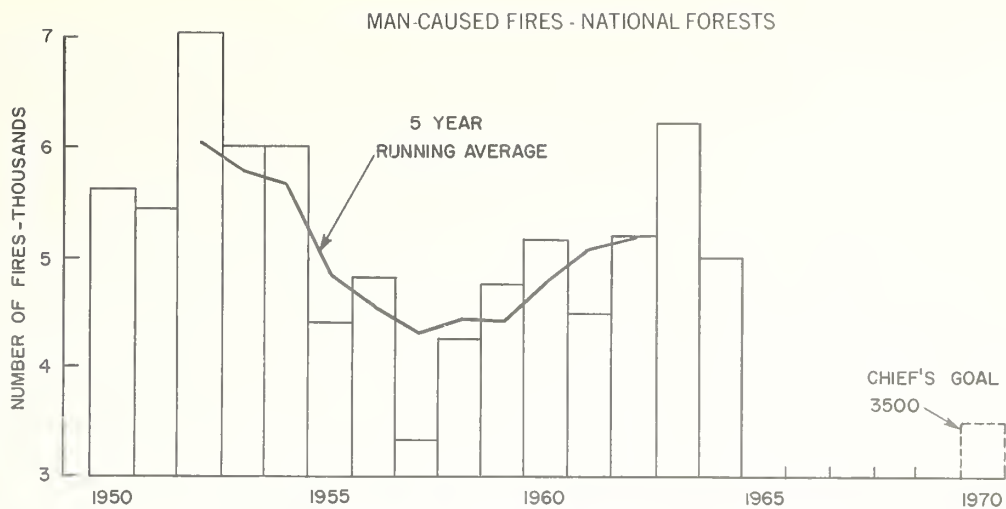
Use of improved firefighting equipment continues to pay big dividends. Such use has strengthened preparedness and made firefighting more efficient, economical, and safe. Such items as the flail fire line trencher, small lightweight portable pumps and improved smokejumping equipment are notable examples.

An infrared mapping unit tested on 20 fires produced fire intelligence of great value to firefighting bosses. This airborne scanner flies over a fire area and picks up the infrared energy emanating from the fire. Photographs are made and this information is relayed to the fire headquarters. The fire boss can thus determine accurately fire perimeter and fire problem areas during day or night. (See Figure K-2, center.)

Fuel modification. Tests on the best and most efficient modification of heavy fuel concentrations continue. Results are providing a firm base for a highly important and badly needed program of fuel reduction. Intensive work is being conducted on the Stanislaus National Forest, California, and Bitterroot National Forest, Montana. (See Figure K-2, bottom.)

Safety. Fire control work exposes personnel to many hazards. Much work is directed each year at making firefighting as safe as possible. Several new items have been used with much success in reducing injuries in recent years. The special firefighters' shirt, bright orange in color so it can be easily seen under smokey conditions, is worn by forest firemen. It is made of a fire resistant material to reduce the chance of burns. Several persons avoided serious burns and injuries during the past year by using the aluminized fire shelter. A special face mask designed for use with a hard hat has been popular with firefighters who are exposed to extreme heat on the fire edge.

Rural fire defense. Handling fire problems in a nuclear attack situation has been receiving renewed attention recently. The Forest Service has been conducting a special fire coordinating study for the Department of Defense, which shows that fire is a significant factor in its threat to life and property at such times. Part of the study is to develop a plan for integrating action in rural and urban areas to handle this problem which would greatly exceed anything encountered in peacetime.



Although there was a significant reduction in 1964, the number of man-caused fires has been increasing since 1957.



Simulated fires place fire leaders in stress situations. They must cope with fire attack problems that simulate actual fire conditions.



Helicopters are being used more for getting men to the fire line quickly and efficiently. Nighttime operation will permit greater use and efficiency.

Figure K - 1



Fire weather mobile stations furnished by U.S. Weather Bureau enable fire managers to keep up-to-date on weather conditions in and around fire areas.

Infra-red imagery taken from an airborne infra-red scanner enables the fire manager to know exactly where a fire is burning.



Heavy fuel accumulations present extreme fire control problems. Fuel reduction work is urgently needed in such areas.

Figure K - 2

(9) Structural Improvements for Fire and General Purposes ... \$10,909,000

An increase of \$44,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Many Ranger District headquarters and field projects are located in remote areas or small communities where adequate housing is not available. Unless adequate housing is provided, it is not possible to headquarter needed personnel at these work locations. Program costs are increased excessively and the job of managing the lands and serving the public suffers severely. There is also a great need for additional fire control structures such as aerial bases, service buildings, and offices in outlying locations.

Adequate communications facilities are mandatory for National Forest protection and administration. Obsolete telephone systems are being converted to radio networks. Inadequate radio systems are being improved to meet communications needs.

Landing fields, helispots, and heliports are highly essential to the effectiveness of the fire control program and multiple use management of the National Forests in making the best use of aerial operations and air equipment. They greatly facilitate rapid initial attack on forest fires, thereby increasing the chance for early control at small size which would result in a reduction of both suppression costs and resource losses. Construction and reconstruction of airport facilities, such as airports, airfields, heliports, and helispots are urgently needed.

Maintenance of the existing facilities is steadily increasing as new facilities are constructed and as the system grows older.

The following work is needed to be performed in fiscal year 1967:

Construction

50 Dwellings and barracks	\$1,150,000
20 Fire lookouts	197,000
40 Service and storage buildings	920,000
20 Office buildings	700,000
300 Airstrips and helispots	280,000
Site acquisition	100,000
Communication facilities	1,050,000

Construct major structure

Plan Missoula Equipment Development Center	\$85,000
Finish Redmond Air Base	200,000
San Dimas Equipment Development Center	<u>70,000</u>

Subtotal, Construction	4,752,000
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Project (9)

Betterment

Betterment of existing structures, site improvements, landscaping	607,000
Betterment of water and sewer systems	500,000

Maintenance

Maintenance of existing improvements	5,050,000
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Total 10,909,000

Examples of Recent Accomplishments

Construction funds were used to provide new buildings and facilities to meet the most urgent needs of the expanding National Forest programs. Emphasis continues on construction of dwellings and barracks to provide housing and crew quarters at locations where private rentals are not available to meet the needs. Field headquarters offices are being provided and obsolete offices replaced to provide adequate working space. Construction of service buildings such as warehouses, shops, and storage buildings at Ranger Stations has proceeded to fill the most urgent program needs. (See Figure L-1.)

Following is a summary of the major fiscal year 1965 accomplishments (including all funds except Job Corps):

	<u>Number of Units</u>	
	<u>Construction</u>	<u>Betterment</u>
Dwellings and barracks	44	64
Fire lookouts	21	12
Service and storage buildings	64	42
Office buildings	18	21
Airfields, heliports, and helispots ...	398	125

The rate of progress is less than is needed to provide adequate facilities in a timely manner. At the rate of construction from fiscal year 1963 to 1965, it would take over 20 years to construct housing for present needs and expansion to 1972. Similar needs exist in service and storage buildings and fire lookouts.

High priority maintenance was accomplished on existing general administrative improvements, consisting of 1,870 fire lookouts, 5,800 dwellings, barracks, and cabins, 700 offices, 6,800 service buildings and related utility systems and airports.

Helicopter setting telephone poles in rough National Forest area in Idaho.



Typical dwelling used for Forest Service personnel in remote areas.

Hangar at Northern California Service Center. Planes are used in forest fire protection.



Figure L-1

(10) Payments to Employees' Compensation Fund \$733,000

An increase of \$64,000 for Bureau of Employees' Compensation is required to reimburse the Employees' Compensation Fund, Department of Labor, in accordance with PL 86-767 (5 USC 785), which was enacted September 13, 1960, for benefit payments made from that fund to employees of the Forest Service who are injured while in the performance of duty. The 1967 payment will be \$733,381. The payment for 1966 will be \$688,586.

(11) Water Resource Development Related Activities \$6,416,000

An increase of \$1,646,000 is needed for the following purposes:

- (a) \$1,632,000 to meet Forest Service responsibilities resulting from increased installation of hydroelectric power, flood control, reclamation, and similar water conservation projects by other agencies. This demand results not only from recently completed projects, but also the unprecedented number of new or planned starts, particularly in the West and in Appalachia. The construction agencies initiate the projects and the schedule of performance; the Forest Service then must comply by cooperating in the planning, development, and management of these water and related resource developments associated with National Forest System lands. As a responsible land management agency with professional capability and an organization in place, the Forest Service can affect economy during the planning, construction, and management phases. The increase is less than needed to meet the objectives of bringing the Forest Service programs current with those of the construction agencies by 1970. However, the Forest Service will apply the fiscal year 1967 increase of funds toward redeeming its responsibilities by making impact surveys, providing public access, use and management facilities, and for performing other essential reservoir related activities.
- (b) \$14,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Examples of Recent Accomplishments

Impact surveys and construction liaison. Impact surveys are those substantive surveys which delineate the effect, define the mitigating measures and enhancement opportunities of water resource developments upon the protection, administration, and management of the National Forests and National Grasslands. Based on survey facts, the report documents items which are essential to the attainment of multiple use objectives when National Forest System lands are related to the project. To be effective, the surveys and reports must be concurrent with the construction agency's preliminary planning and must, without fail, precede licensing or authorization. (See Figure M-1.)

Liaison with the construction agency is necessary during the construction period to facilitate coordination between the construction agency and the Forest Service. Protection of the land and resources, minimizing interference with regular protection and management activities, and facilitating construction agency operations are direct economic dividends derived from this program.

Among the projects for which the Forest Service made impact surveys and provided liaison during fiscal year 1965 are: Spruce Park, Glacier View, Lower Canyon, Penny Cliffs, Libby, Ruedi, San Juan-Chama, Cabin Creek, Fruitland Mesa, San Miguel, Glen Canyon, Central Utah, Upper American River, Oroville, Pacific Northwest-Pacific Southwest Intertie, Baker, High Mountain Sheep, Allegheny, Rowlesburg, Royal Glen, Cathright, Flannagan, Pound, Cave Run, Laurel, French Broad, Lee Creek, and Middle Fork Anderson.

Project (11)

Public access, use, and management facilities. Where the Forest Service has jurisdictional responsibility it must provide the necessary facilities to make water development projects accessible for safe public use and enjoyment. Increases for fiscal year 1967 would be used to provide facilities required to partially meet the initial demand.

Among the completed projects now urgently requiring facilities during fiscal year 1967 are Flaming Gorge in Utah, Shasta-Trinity in California (See Figure M-2), Blue Ridge in Arizona, Hungry Horse in Montana, and Hills Creek in Oregon.

Over 10% of fiscal year 1965 funds allocated to the Forest Service for regular recreation programs was allocated to provide facilities at such major projects as Allegheny in Pennsylvania, Flaming Gorge in Utah, Sam Rayburn in Texas, Parker Canyon in Arizona, and Shasta-Trinity in California. However, facilities installed at Flaming Gorge and Shasta-Trinity have fallen far short of meeting the initial demand. A sizable backlog of required work must be completed in accordance with public need and agreements with the Bureau of Reclamation and National Park Service.

Tremendous recreation pressures are expected to be generated as the Sam Rayburn and Allegheny reservoirs fill. Formal agreements with the Corps of Engineers require that additional funds be programed for facilities at these two reservoirs.

Facilities are also required for Cave Run in Kentucky, Choccolocco in Alabama, and Toledo Bend in Texas, which are presently under construction.

Soil stabilization and cover improvement. Increases are required in this activity to improve soil and water conditions on tributary watershed lands. The prevention of erosion and improvement of soil cover will improve the quality of water and enhance and prolong the life of the water resource development. Land treatment is required to protect the multimillion dollar investments in water resource developments.

During fiscal year 1965, a meager amount of work was accomplished through the use of regular soil and water rehabilitation funds for land treatment on National Forest lands tributary to Joe's Valley and Shasta reservoirs. (See Figure M-3.)

WATER RESOURCE DEVELOPMENT RELATED ACTIVITIES



Impact surveys and liaison work at Hungry Horse Reservoir provide essential direction needed for harmonizing plans and activities of water resource development agencies with plans and programs for the Flathead National Forest.



Each hydroelectric project requires transmission facilities. Impact surveys are needed to evaluate proposed routes and to prescribe locations which minimize impacts on National Forest. Recommendations were made for fire prevention and suppression, location of access facilities and soil stabilization at Lolo Pass, Mt. Hood National Forest.

Figure M-1

WATER RESOURCE DEVELOPMENT RELATED ACTIVITIES



Lack of public access, use and management facilities at Shasta Reservoir results in congestion, deterioration of desirable public use sites, fire hazard and unsanitary conditions on the Shasta Trinity National Forest.



Well designed facilities at Flaming Gorge provide opportunities for public enjoyment and safe use on the Ashley National Forest.

Figure M-2

WATER RESOURCE DEVELOPMENT RELATED ACTIVITIES



BEFORE



DURING

SOIL STABILIZATION AND COVER IMPROVEMENT

Treatment of tributary lands prolongs life and value of Shasta Reservoir on the Shasta-Trinity National Forest.



AFTER

BOTTOM PHOTOS:

Debris interferes with public use, threatens public safety and diminishes resource values and natural beauty of the Willamette National Forest.



DEBRIS ABOVE DETROIT RES.



DEBRIS IN HILLS CREEK RES.

(12) Fighting Forest Fires \$5,000,000

No program increase is proposed for fiscal year 1967.

This program provides for forest fire fighting on the National Forests and Grasslands. It permits employment of emergency forces when weather conditions are above normal. The costs of the regular fire protection organization are paid from the National Forest Protection appropriation. When critical fire conditions occur, it has been found advantageous to build up temporary forces in the most threatened areas. Long experience shows material savings are made by having a strengthened force ready to discover and attack fast-spreading fires. Damage and suppression costs are thus materially reduced over what might be expected from normal crew strength and normal procedures.

The calendar year 1964 fire season. The fire season was characterized by critical conditions in California during the late summer and early fall. In contrast, the Pacific Northwest had a favorable June through September. There were extremes from very wet in western Washington to very dry in eastern Washington. The Southwest followed the pattern of variations of fire weather locally, but generally had a dry fall period.

Weather conditions east of the Mississippi were nearer to normal, but many areas had serious rainfall deficiencies. There was one period of extreme fire danger during the fall in the eastern and central States. Special regulations were imposed and special precautions were taken during this period to prevent as many man-caused fires as possible.

Number of fires down. Fire occurrence on the National Forests decreased from the 5-year average of 12,370 to 9,749. Burned area also decreased from the 5-year average of 230,065 acres to 183,154. National burned area increased over 1963 because of the large fires in California and Nevada. The number of man-caused fires increased steadily from 1957 to 1963 after a modern-day low of 3,305 man-caused fires in 1957. Special efforts made in 1964 helped to change this trend. It is encouraging to note that man-caused fires were down to 5,132 in 1964, compared with 6,269 during 1963.

Major fires. There were 61 fires that exceeded 300 acres in size in 1964. This compares favorably with a 5-year average of 90 such fires. One especially large and damaging fire started on the Los Padres National Forest near Santa Barbara, California, on September 22, 1964. It was controlled on October 1 after burning 63,000 acres. Natural resource and property damage inside the Forest Service protection boundary was more than \$17 million.

Fatalities. Five persons were killed while fighting forest fires on the National Forests in 1964. Two contract air tanker pilots lost their lives dropping chemical retardants on fires. One of these occurred in California and the other in Arizona. A helicopter crashed and the

pilot was killed in Washington. He was returning to his home base after delivering firefighters to a remote area. One firefighter died from burns on the Coyote Fire in California and another was killed in Colorado from being struck by the tail rotor of a helicopter as he was preparing to be transported to a remote location.

The 1965 fire season was below normal in most areas through October. Weather conditions were generally favorable. Moisture deficiencies persisted in the Northeast and South, but there were no large fires. 8,617 fires burned 58,598 acres through October. This compares very favorably with the 5-year average of 11,758 fires and 201,977 acres burned during the same period. Man-caused fires were down from the 5-year average of 4,643 to 3,349.

Fatalities. Seven men were killed in fire control activities during 1965. A pilot and smokejumper spotter died when their Twin Beech aircraft crashed in a mountainous area while dropping supplies and tools to smokejumpers in Idaho. Another pilot and observer were killed in Oregon when their plane crashed on a routine flight. A firefighter died from complications several weeks after being hospitalized as the result of a hard landing in a helicopter. Two other firefighters died on the fireline--one from a heart attack and the other from being hit with a rolling rock.

(13) Insect and Disease Control \$12,371,000 .

An increase of \$196,000 is needed for the increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The objective of this program is to reduce damage and loss caused by insects and diseases to levels commensurate with uses and values involved on all forest lands irrespective of ownership. Control work is accomplished in cooperation with other Federal and non-Federal agencies. Authorization is contained in two Federal laws--the Lea Act of 1940 which deals specifically with the introduced white pine blister rust disease, and the Forest Pest Control Act of 1947 which deals with forest insects and all other tree diseases. Both acts contain provisions for Federal cost-sharing on non-Federal land.

Following are the 1966 objectives for the white pine blister rust control and the other pest control programs:

DISEASE CONTROL

1. White Pine Blister Rust Control
 - (a) Perform maintenance surveys on 1,940,000 acres
 - (b) Eradicate ribes bushes from 220,000 acres
 - (c) Apply antibiotic fungicides to 17,000,000 trees
2. Oak Wilt Control
 - (a) Surveys of oak forests to locate infected trees 47,000,000 acres
 - (b) Destroy or treat infected trees 5,000 trees
3. Dwarfmistletoe Control
 - (a) Intensive surveys on pine stands to locate infected trees 250,000 acres
 - (b) Control disease on 5,000 acres
4. Other Disease Surveys 128,000 acres

INSECT CONTROL

1. Bark beetle control -- Treat infested trees, cull logs, stumps, and slash 1,155,000 units
2. Defoliator control -- Aerial application of insecticides on 825,000 acres
3. Plantation insect control -- Aerial or ground treatment on 25,000 acres

Examples of Recent Accomplishments

White pine blister rust control. Major control effort is now in the West where maintenance control is yet to be established on 74% of the 2.9 million acres of high value white pine stands selected for protection. In the East and Lake States the control program is more advanced and most areas under protection are on a maintenance control basis.

Project (13)

Accomplishments in calendar year 1964 were:

10.7 million white pine trees on 102,000 acres in North Idaho were treated with antibiotic fungicides.

2.9 million acres countrywide were systematically surveyed to determine status of and need for control treatment.

7 million ribes (alternate host of the disease) were removed from 183,000 acres in the East and Lake States and in the Pacific Coast States. This protected some 18-1/2 million valuable white pine trees.

Control of Forest Insects and Other Diseases:

Bark beetle suppression requires largest share of control effort. Countrywide 1.3 million infested trees, cull logs, and stumps were logged, cut, piled, and burned, or chemically treated to check tree-killing caused by bark beetles. This action prevented the infestation from spreading to 6-1/2 million healthy trees. The extensive epidemic in the Black Hills of South Dakota and Wyoming was checked, with only maintenance work remaining. Except for the Targhee and Teton National Forests, insect populations were kept at endemic levels in other parts of the country. Good progress toward checking the epidemic on the Teton National Forest was made but additional work is required. On the Targhee National Forest, a widespread and especially virulent outbreak intensified. This outbreak has already killed 13 million board feet of lodgepole pine and threatens an additional 35 million feet, plus extensive recreational stands in Yellowstone National Park. Control was started in 1965 and will be continued in 1966. (See Figure N-1.)

Douglas-fir tussock moth suppressed in the West. In Idaho, Oregon, and California, prompt aerial spraying was necessary to suppress virulent outbreaks of Douglas-fir tussock moth. A total of 241,000 acres was successfully treated--120,000 in Idaho, 65,000 in Oregon, and 56,000 in California. This protected about 4.5 billion board feet of fir timber.

Valuable Pennsylvania hardwoods protected from cankerworm damage. In cooperation with the State of Pennsylvania, 100,000 acres were aeri ally sprayed to check extensive defoliation of valuable northern hardwoods by fall cankerworm.

Defoliation of aspen stands checked in Arizona. A joint aerial spraying project against Great Basin tent caterpillar on 22,700 acres in Arizona was completed by the Forest Service, National Park Service, and Bureau of Indian Affairs to protect aspen in heavily used recreation, scenic, and watershed areas.

Spruce budworm suppression deferred. Currently 4.5 million acres of forest land are infested by spruce budworm. In 1965, plans were laid to spray approximately one million acres. However, spraying was withheld pending further development of promising new insecticides with less adverse side effects than DDT on the environment. Control activities were confined to testing low volume malathion application by both fixed wing planes and helicopters on 13,000 acres in Idaho and Montana.

Pesticide evaluation and screening continued. Non-persistent insecticides found by the Forest Service's Pesticide Evaluation Unit to be promising substitutes for DDT were tested against spruce budworm infestations on the Bitterroot National Forest in Montana. Intensive monitoring for possible adverse side effects was done in connection with all such tests by the U. S. Fish and Wildlife Service and the Montana State Fish and Game Commission.

Monitoring was continued on areas aerially sprayed with DDT. All projects where DDT was used were intensively monitored to provide (1) short-term information on DDT residue levels in big game, fish, aquatic insects, water, range cattle, and forage; and (2) basic information for long-term studies to determine DDT levels and persistence in an aquatic environment, and movement of the chemical and its metabolites from conifer litter through soil particles. (See Figure N-2.)

The Federal-State cooperative insect and disease control program on non-Federal lands was expanded. Seven more States entered into cooperative agreements with Forest Service to share the cost of insect and disease control on non-Federal lands. Nineteen States are now in the program.

Biological control of larch casebearer expanded in Idaho. The larch casebearer has spread rapidly in Idaho and Montana since its discovery in 1959 near St. Maries, Idaho. Following investigations of biological control in 1960-1963, nearly 9,000 parasitic wasps, reared from casebearer-infested twigs collected in Vermont, were liberated in 1964 in six infested larch stands in Idaho. The parasites have become established and, when strong colonies are available, they will be collected and distributed in other infested areas.

DEPARTMENT OF THE INTERIOR

(Forest pest control activities under funds transferred from the Department of Agriculture for insect and disease control)

Introduction

Approximately 182 million acres of forest and woodlands are administered by the Department of the Interior; including 8.3 million acres by the National Park Service, 2 million acres by the Bureau of Sport Fisheries and Wildlife, 13.1 million acres by the Bureau of Indian Affairs and 159.8 million acres by the Bureau of Land Management. Prevention of serious losses from disease and insects on these forest lands is an important activity under the Forest Protection program.

Project (13)

Control Accomplishments in Fiscal Year 1964 - Blister Rust. There are about 550 thousand acres of blister rust control areas administered by the Department of the Interior of which 380 thousand are under the direction of the National Park Service, 100 thousand under the direction of the Bureau of Indian Affairs, and 70 thousand under the direction of the Bureau of Land Management.

Bureau of Land Management control work involves three methods:

1. Alternate host (ribes) eradication.
2. Use of antibiotics to control blister rust in sugar pine trees.
3. Development of rust resistant sugar pine seedlings through controlled pollination.

The use of antibiotics in infected trees, and the development of rust resistant seedlings from controlled pollinated seeds, appear to have good possibilities in improving the management and production of sugar pine stands.

The National Park Service conducts white pine blister rust control in 15 National Parks containing over 380 thousand acres of control area. Control is by eradication of ribes or using antibiotics, whichever is more practical for the area.

On much of the Bureau of Indian Affairs 100 thousand acres of control area, the work of eradicating ribes is accomplished by Indian work crews. This is done on reservations in Minnesota, Michigan, and Wisconsin.

Insect and Other Diseases. The outbreaks of pine bark beetles have increased to epidemic stages in many areas during the past year, requiring more intensified efforts if the epidemics are to be controlled.

The National Park Service has pine beetle control projects, either new or continuing, in Grand Teton, Lassen Volcanic, Yosemite, Sequoia, King's Canyon, Rocky Mountain and Wind Cave National Parks; and Devil's Tower, Jewel Cave, and Mount Rushmore National Monuments.

The Bureau of Land Management has pine bark beetle control projects, either new or continuing, in Colorado, Wyoming, and South Dakota.

Excellent results have been reported in pine bark beetle control where treatment has been completed.

The Bureau of Indian Affairs has continued control of dwarfmistletoe infections on limber pine in the Mescalero Indian Reservation in New Mexico.

A spruce budworm infestation that has spread generally through northeastern Idaho and western Montana has been controlled in only a few areas, since the only known effective insecticide (DDT) has been banned due to its adverse environmental effects. This spruce budworm epidemic continues to spread and will require control measures in the next few years if thousands of acres of Douglas-fir timber are to be saved.



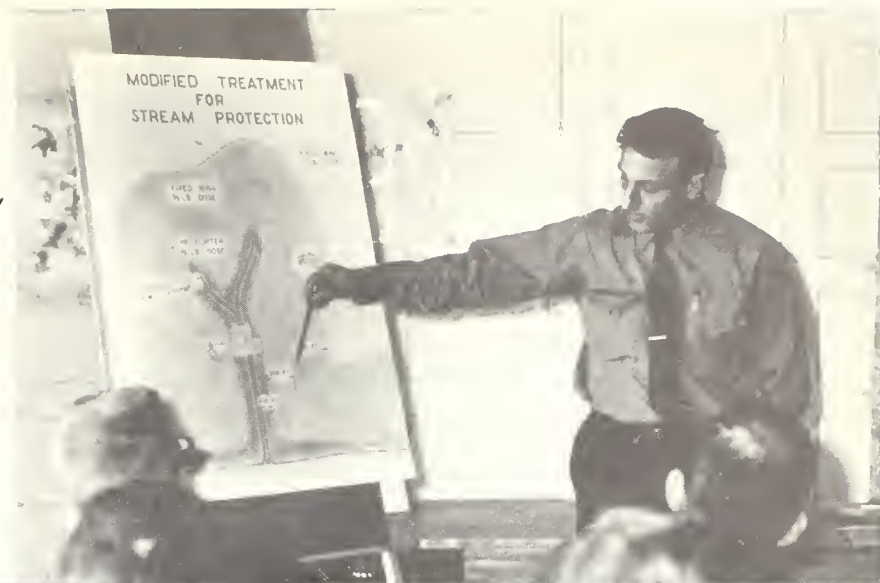
Penetrating insecticides applied to the bark surface of beetle - infested trees kill the insects and prevent their spread to healthy trees.



Cutting, piling, and burning infested trees is an effective and economical way to control bark beetle epidemics.

Figure N - 1

Spray pilots are thoroughly briefed before spray operations to avoid insecticidal contamination of rivers and streams in the spray area.



Game biologists closely check fish and fish - food organisms to determine the impact of aerially applied insecticides.

Figure N - 2

(14) Acquisition of Lands (Weeks Act) \$2,480,000

An increase of \$1,800,000 is needed to complete the acquisition of the major property (40,000 acres) within the Redbird Purchase Unit, Kentucky. This property is the key to success in this part of the Appalachian Program. Such acquisitions permit more efficient management, protection, and administration of water, wildlife, and other forest resources.

An increase in acquisition of key inholdings within the National Forests and National Forest purchase units becomes increasingly urgent. The Department's Development Program for the National Forests recognized the need to ultimately acquire some 7,000,000 acres of private inholdings in need of land rehabilitation. Included in the program are lands depleted by repeated fires, poor logging practices, clearing and cultivation of steep and erodible mountain lands, and disturbed mineral exploitation areas. Many of the lands in need of rehabilitation are located in economically depressed areas and/or are within a working radius of Job Corps Centers. Their acquisition will provide additional lands which will contribute to a healthful working environment for the corpsmen.

The objective of the present 10-year program (1963-1972) is to purchase 967,000 acres of key inholdings of land for National Forest purposes. These are lands valuable for watershed and timber production purposes and having only secondary value for recreation. Lands primarily valuable for recreation purposes are not included.

Examples of Recent Accomplishments

In 1965 a total of 162 tracts were approved for purchase under authority of the Weeks Act. These cases involved the acquisition of 26,519 acres at a total cost of \$1,042,450. The cases are of two kinds: (a) regular Weeks Act transactions to be acquired with funds specifically appropriated for land purchase under this authority and (b) the first approvals of properties to be purchased with moneys appropriated from the Land and Water Conservation Fund.

The regular Weeks Act transactions are the usual routine purchases of tracts suited to timber production and watershed protection in areas where National Forest ownership needs to be consolidated or extended to facilitate these programs. The 1965 cases, 116 in number, involved 15,433 acres at a total price of \$415,783 or \$26.94 per acre. These properties are small averaging less than 160 acres per tract.

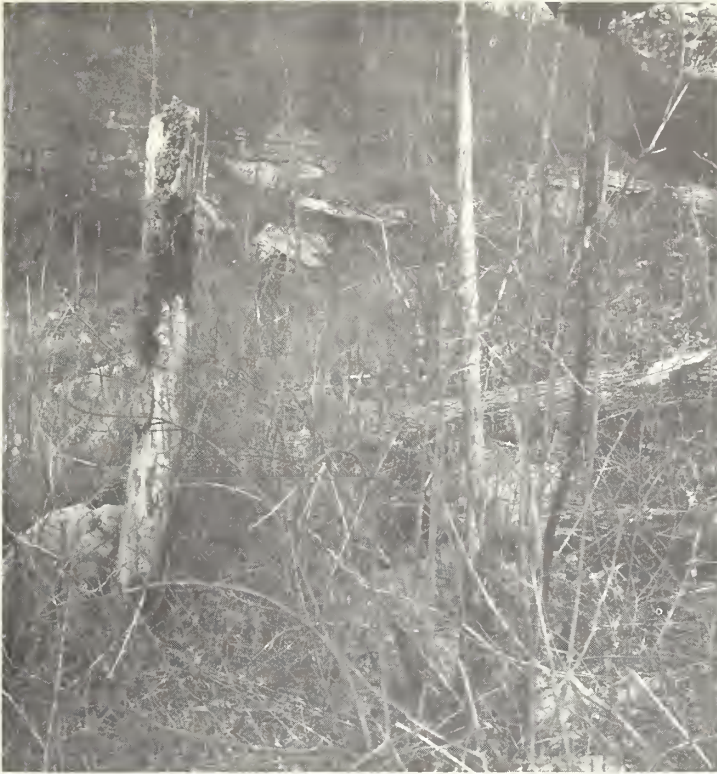
There is a large backlog of actionable offers from private owners who are anxious to sell their properties under this regular Weeks Act program. Normally, there is no extreme urgency about acquiring any particular tract that is offered. Each year the Forest Service, to the extent of the available funds, selects those tracts that are best suited to the immediate program needs.

Project (14)

The Land and Water Conservation Fund program is different in that there are specific key tracts that are critically needed in connection with the public recreation program of the Forest Service. Failure to promptly acquire these properties may result in their being subdivided and developed to the extent that their value for public recreation purposes is largely lost. Generally these tracts are more costly than those purchased in the regular Weeks Act program. There were 46 such properties approved in 1965 at a total cost of \$626,667 or \$56.53 per acre. More costly properties are under consideration.

The authority of the Weeks Act will be used for the purchase of lands in Appalachia during fiscal year 1967.

ACQUISITION OF LANDS (WEEKS ACT)



Forest and watershed lands which have been completely cutover. These are basically productive, but stable ownership, continuous protection and skillful management for many years will be required to restore marketable timber and optimum watershed conditions. National Forest purchase and management programs will provide stability of tenure and technical skills to restore the soil, forest, watershed, and scenic resources.



Strip mined lands contribute to soil erosion, stream pollution, and devastating floods. Long-term programs for adequate treatment measures can minimize these damaging effects and increase the land's productivity. The program for Appalachia contemplates public acquisition and repair of such lands as part of the National Forest system.

Figure O-1

(15) Timber Management Research \$8,085,000

An increase of \$58,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Timber Management Research develops cheaper and more effective methods of establishing, managing, and improving forests for the production of timber and timber-related products, in harmony with other forest uses. The core of this research is determining the proper culture for over a hundred different commercial timber species in the United States. This silvicultural research includes seed production, seeding, planting, thinning, pruning, and stand regeneration measures. It involves the control of brush and other competing vegetation, and the protection of the new stand from animals. Other phases of the program deal with soil and site improvement for timber production, and the development of improved strains of trees through selection and breeding of superior types.

Timber Management Research also provides forest managers with information on the yield of forests in terms of various products such as lumber, plywood, poles, piling, and pulpwood, and the influence of cultural practices on the yield and quality of the stand. The program also includes research on methods of producing timber-related forest crops such as gum naval stores, maple sap, Christmas trees, and other income-producing natural products from forests.

This production-oriented research is backstopped by fundamental research on the physiological growth requirements of forest trees, on variation and inheritance in tree characteristics that have economic value, and on new approaches to difficult measurement problems involved in the management of forest properties.

In all of this research the aim is to meet the Nation's need for production of timber and related forest crops, and to perpetuate forest stands for multiple use. In view of the inroads on forest lands being made by urban expansion, highways, parks, and other developments, these future needs will not be met at reasonable cost unless technological progress in forest management is increased. Cheaper and better methods must be found to reforest deforested acres, to keep existing forest lands continuously productive, to increase their value for industrial and other uses, and to establish and maintain tree cover for natural beauty and related purposes. (See Figure P-1.)

Examples of Recent Accomplishments

Cheapest form of nitrogen best for pine. Loblolly pines, and probably most pines, are selective in the form of nitrogen fertilizer utilized. In a greenhouse study equal amounts of nitrogen in the form of nitrate, ammonium, or urea were supplied to loblolly pine seedlings. After four months seedlings supplied with urea had grown the most and had the highest content of nitrogen in the foliage. These results, if confirmed by field trials, are of great practical importance because urea is usually the least expensive type of nitrogen fertilizer.

Fertilization and irrigation increase timber yield. Looking toward future needs for more intensive silviculture, a study in Arkansas showed that fertilization and irrigation increased the yield of pulpwood in a loblolly pine plantation by 34%. For an 8-year period the plantation grew at the rate of 2.5 cords per acre per year. Although the specific gravity of the wood decreased following fertilization alone, the combined watering and fertilizing treatment resulted in only a minor decrease in specific gravity. The yield of pulpwood on a weight basis thus increased substantially.

Light speeds germination of pine seed. The effectiveness of stratification in breaking dormancy of loblolly pine seed can be more than doubled by exposing seed to light during stratification. Germination increased directly with the length of stratification periods ranging from 7 to 56 days. It increased from 8 to 57% for dark-stratified seed and from 52 to 98% for light-stratified seed. In addition to increasing the amount of germination, light during stratification reduced the time required for germination by about one-half. This new information will be of special value when seed supply is low and when time for stratification is limited. It will be of particular value in getting maximum germination of high-value seed from improved and superior trees.

Yellow-poplar reproduces from naturally stored seed. Detailed studies of the reproductive habits of yellow-poplar are providing reliable methods for regenerating this valuable species after clearcutting. In a recent study in Illinois and Indiana, it was found that yellow-poplar seed remained viable for at least four winters in the forest litter. Under natural conditions viable seed accumulate for several years and germinate when seedbed conditions are suitable. Some seed germinate in the forest litter before harvest cutting, but the seedlings rarely live more than one growing season. Natural stratification on the forest floor for one winter does not break dormancy in all seed, but after stratification for two winters most of the seed will germinate if other conditions are favorable. With proper harvest cutting to expose a favorable seedbed there is little need to reserve seed trees on harvested areas to reproduce yellow-poplar.

Mycorrhizal fungi survive nursery sterilization and slash burning. Mycorrhizae, which are considered to be essential for good growth of most trees, are not seriously inhibited by either sterilant treatments in the nursery or by slash burning in the forest. In a PL 480 project in Finland, mycorrhizal development was delayed on pine and spruce seedlings after the nursery soil had been treated with various sterilants to control weeds and disease organisms. But by the end of the season the mycorrhizal development and seedling growth equalled, or in some treatments exceeded, that in the untreated soil. Similarly, slash burning retarded but did not prevent mycorrhizal formation. The high surface temperatures did not penetrate deeply enough to kill the fungi and the decrease in soil acidity resulting from ashes left on the ground after the fire was not enough to inhibit fungi. These findings are important in that they remove doubts concerning the deleterious effects of these common silvicultural practices.

Prescribed fire effective for aspen conversion. In the Lake States, nearly a third of the forest land is now in aspen. Much of this area might best be converted to conifers if the aspen could be removed and the regrowth of suckers prevented. Studies in Minnesota show that this can be accomplished with two or more prescribed burns in the spring before growth begins. The spring season offers dependable prescribed burning weather in the Lake States. Of the brush and hardwood species studied, aspen is the only one that shows a decline in vigor and abundance of sprouting after repeated dormant season burning.

Rust and weevil resistance inherited in pines. Geneticists are breeding slash pines for resistance to fusiform rust which causes severe losses in the South. Progenies from rust-free and rust-infected parents have been exposed to intense rust infection in Mississippi. Infection in progenies from two rust-free parents was about 50% in contrast to 90% infection in progenies from other parents. The results confirm our earlier finding that rust-resistance is heritable. Further, they justify the practice of excluding all rust-infected trees from slash pine seed orchards. In the Northeast, the white pine weevil is the major cause of declining production and use of the valuable eastern white pine. The first progeny tests examined for weeviling show that resistance to this insect is genetically controlled. This finding points the way to a breeding program to develop weevil-resistant white pines.

Insect-resistant pine hybrids grow well in California. Before hybrid trees can be used widely they must be tested under a variety of environments to determine their range of adaptability. Eight hybrid and native pines were planted in 1950 at 5,280 to 6,420 feet in the central Sierra Nevada of California to determine their potentials. After 12 years the most promising was the backcross hybrid Jeffrey x (Jeffrey x Coulter). It grew well and incurred little damage by insects, snow, or porcupines. In addition, it will resist tree-killing weevils and bark beetles found in this region. This backcross hybrid now is being bred in large numbers for outplanting on National Forests in California. It should perform as well as susceptible native ponderosa and Jeffrey pines up to about 6,000 feet.

Inbreeding effects persist in western white pine. Geneticists have known for some time that self-pollinating or inbreeding a seed tree generally produces slow-growing seedlings. They have predicted dire consequences of using inbred seed. Measurements of 9- to 12-year-old inbred and out-crossed western white pine progenies in Idaho show that survival of the inbreds was reduced 13 to 20%; height was reduced 22 to 43%. These findings emphasize the importance of avoiding seed from isolated trees where inbreeding is likely. In the nursery, slowest-growing seedlings should be culled because they are likely to be inbreds that will continue to grow slowly.

Two marker genes found in slash pine. Plant breeders often use simply inherited visible traits to learn more about inheritance of commercially important characters in plants. Two such traits have been found in progenies of slash pine in the tree breeding program for oleoresin yield

at Olustee, Florida. These traits have been used to learn about inheritance and self-fertility in this important species. Controlled breeding of a tree producing yellow oleoresin showed that this trait was inherited, but the number of genes involved has yet to be determined. Controlled breeding on two other trees, having yellowish foliage, showed that this trait was also inherited. The exact mode of inheritance of these characteristics is yet to be determined. These traits are useful "gene markers" that can be detected at a very early age. During the next year this type of research will be extended to determine the mode of inheritance of the constituents of turpentine in slash pine.

New pines from needle bundles. Unique trees can be used immediately in genetics studies or in planting programs if they can be vegetatively propagated cheaply and in large numbers. Great quantities of genetically identical plants could be produced if the needle fascicles on a pine could be grown into plants. Studies at Rhinelander, Wisconsin, show that jack pine can be successfully raised from rooted needle fascicles providing the fascicles are taken from young trees and possess well-developed buds. Related studies are underway to solve the difficult problem of propagating older trees from needle fascicles.

Male cottonwoods taller than females. High priority is being given to genetic improvement of eastern cottonwood as planting of this fast-growing species expands. The relationship between sex and desirable characters was studied in natural stands in the lower Mississippi Valley. Male trees were found to be significantly taller than female trees, but only slightly larger in diameter. This confirms for cottonwood the male-superiority in growth found for other poplars. Form class, stem straightness, branchiness, and specific gravity of the wood were not related to sex of the tree. Thus, sex of the trees has to be taken into consideration only when trees are being selected and propagated for height growth.

Pine gum quality improved with herbicide chemical stimulant. For some years the accepted method of turpentinizing southern pines has included spraying a 50% solution of sulfuric acid on the fresh wound to prolong the flow of oleoresin. This method halves the necessary frequency of wounding, but the acid is hazardous to workers and corrosive to the metal cups and gutters used for gum collection. Recent research indicates that these hazards might be avoided by substituting 2,4-D for sulfuric acid. A 4-year comparison of the two stimulants showed that a 2% solution of 2,4-D provided just as much gum yield as sulfuric acid. Corrosion of metal cups and gutters was greatly reduced. With sulfuric acid, iron contamination from the corroded metal progressively lowered the grade of gum after the first year, whereas with 2,4-D the grade of gum remained high over the four years of operation. The 2,4-D solution kills longleaf pine, but its use should improve naval stores practice on the large acreage of pure slash pine plantations now coming into production for naval stores.

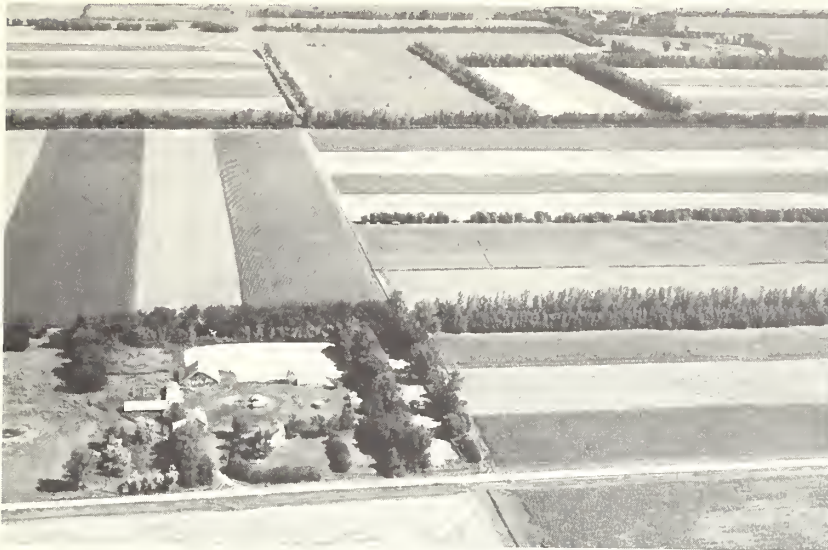
New book describes trees of Puerto Rico. Forestry in the tropical and sub-tropical regions of the United States is concerned with trees not commonly known or recognized by foresters. Compiled in a new book are descriptions of the distinguishing characters, size, appearance, wood uses, and distribution of 250 common native trees of Puerto Rico and the Virgin Islands. Another 130 species related to these also are included. This reference text should be valuable to foresters, teachers, students, and others who are interested in tropical American timber trees.

Most profitable stocking levels determined for loblolly pine. One of the most useful studies thus far attempted in management planning was recently completed for loblolly pine in the Southeast. Comprehensive information on the growth and yield of managed stands of loblolly pine provided the foundation for an economic analysis where profit maximization was to be the goal of management. The analysis provided for varying stumpage prices, stand ages, site indexes, stocking levels, rate of interest and regeneration costs for either pulpwood or sawtimber. A quality differential, expressed in stumpage prices, was recognized. Stocking levels in loblolly pine which maximize profit are less than those which maximize volume production. Rotation ages are lengthened for lower rates of interest, for better sites, and for higher regeneration costs. Optimum rotation ages for specified interest rates and site qualities varied from 25 to 35 years for pulpwood only, from 35 to 55 years for sawtimber with no quality differential, and from 40 to 70+ years with a quality differential.

Slash pines planted successfully in mid-summer. In northern Florida, characterized by very long growing seasons and wet summers, recent research showed that slash pine can be planted successfully as early as mid-July of the year in which seed is sown in the nursery. The summer-planted stock survived and grew as well as did winter-planted stock a full year old. Summer planting in the mild climate of north Florida has several advantages: (1) a longer planting period and less chance of seedling losses when weather or other conditions prevent planting in the usual season; (2) nursery work can be spread over a longer period and thus avoid the seasonal rush; (3) use of nursery and planting equipment will be spread over a longer period; (4) manpower for summer planting can be utilized, in some cases, during what might otherwise be a slack season.

Timber site quality identified from aerial photos. For some purposes, an adequate estimate of the potential of the site for growing oaks can be made from measurements obtained from topographic maps or aerial photographs. In a study in West Virginia on soils derived from sandstone and shale, site index of oak was found to be strongly related to slope direction, to the position relative to the top of the slope, and to the percent of slope. A predicting equation based on these three variables was developed from which forest managers in this area can easily select the best sites on which to grow oak. On soils derived from limestone, the site index was generally higher than on other soils for the same topographic conditions.

IMPROVING THE QUALITY OF MAN'S ENVIRONMENT BRINGS NEW TREE-PLANTING PROBLEMS



Shelterbelts to slow the wind, provide shade for man and animals or add variety to the Plains.

Urban plantings to cushion airport noise, suppress propwash, or enhance the landscape.



Screen plantings to shield a curve from oncoming headlights, hide a junk yard, stabilize a road cut, or add beauty to an Interstate highway.

Figure P-1

(16) Watershed Management Research \$3,303,000

An increase of \$23,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Watershed Management investigations are aimed at development of methods and techniques for managing forest and related range watersheds to:

- (a) increase water yields or improve the timing of water yields under a variety of climatic, soil, geologic, vegetative, and topographic conditions by changing the pattern, density or type of forest cover;
- (b) give adequate protection to soil and water resources while forest and related rangelands are being used for timber production, grazing of domestic livestock and big game, wildlife habitat and forest recreation;
- (c) rehabilitate forest and related rangeland watersheds that constitute serious sources of damaging flood runoff and sediments; and (d) aid forest soil development and improvement.

Between half and three-fourths of the water flow of the United States originates in forests, associated rangelands and alpine regions which form the headwaters of all major river systems. Generally accepted estimates of water demand indicate a doubling by 1980, and the most logical place to look for additional supplies of good-quality water is in these headwater regions. However, there is ever-increasing demand to use these lands for other products and services, and the manner of their management can make the difference between beneficial, well-regulated, sustained streamflow of good quality or erratic and silt-laden flow of destructive character.

Examples of Recent Accomplishments

Critical low streamflow nearly doubled the first year after timber harvest. Harvest of 80% of the trees from a 237-acre experimental watershed on the western slope of the Oregon Cascade Mountains produced an 85% increase in the low flow of the main stream. Lowest streamflow in this area occurs from mid-August to mid-November following 60-90 days of little or no rain. Yet the summer season is when the dense forest vegetation makes its greatest demands upon the soil water. This water is saved for slow drainage into late-season streamflow when the trees are removed and is useful for sustaining freshwater fisheries and irrigation. Even the removal of only 30% of the trees from a watershed produced about 20% increase in low flow. (See Figure P-2.) Thus a planned system of timber harvest by clearcutting in patches could significantly improve late-season streamflow.

Prefabricated concrete check dam designed for watershed rehabilitation and other purposes. A prefabricated, partially prestressed concrete check dam has been designed for use in rather inaccessible mountain forest areas. The structure is made up of units of predetermined size which are suited to mass production; require a minimum of labor, machinery and supervision; and are adaptable to a wide variety of sites and situations. The dam is relatively inexpensive and cost factors can be easily estimated in advance. The dam can be placed within three hours, not including time for excavation and backfill. It fits together with bolts and steel plates. All of the heavy work can be done with a backhoe.

Watershed conditions least damaged by high-lead logging method. A comparison of surface soil conditions following logging in old-growth Douglas-fir by the high-lead system and by tractor shows the high-lead system to be less damaging. Protection of watersheds becomes more critical as logging operations move into steeper and less stable areas. Tractor logging caused three times as much area of compacted soil as did the high-lead system. This causes more rapid surface runoff of water and consequent erosion. Furthermore, 57% of the area logged by high-lead was totally undisturbed as compared to only 36% under tractor logging. (See Figure P-2.) The undesirable effects of tractor logging are reduced on slopes less than 20-30% and where skidroads are located on the contour.

Erosion and sediment reduced by controlled grazing and improved ground cover. Density of ground cover vegetation and volume of sediment produced from three experimental watersheds in the Rio Puerco drainage of New Mexico were measured during two periods: (1) before grazing control was achieved and (2) four years after uniform grazing was achieved. At the end of the uncontrolled grazing period, average ground cover was only 3 to 5% and sediment from erosion was 0.7 acre-foot per year. Four years after grazing control, ground cover of vegetation was 6 to 12% and sediment had been reduced to 0.2 acre-foot per year. The study re-emphasizes that grazing management in areas subject to erosion must be such as to maintain adequate protective cover of vegetation.

Alpine snow fields sustain summer streamflow. Study of a 277,000 acre area in the east-facing Front Range of northwestern Colorado reveals a high potential for summer water yield from alpine areas. (See Figure P-2.) Based on average snow density and average vertical reduction in snow depth, computations indicated that the 57,000 acres of alpine area had a water yield potential of 32,000 acre-feet during August and September. This is the equivalent of 3.75 acre-feet of water per acre of snow or 7 acre-inches of water from the entire alpine area. This potential yield will vary from year to year according to the depth of snowpack, but the study is confirmation that summer water yields from alpine snow fields are high. Additional research has shown that for each 100-125 feet of 8-foot high snow fence built to increase the snowpack in these snow fields an extra acre-foot of water can be made available in storage for use after July 1. This would normally extend the snowmelt runoff by about two weeks.

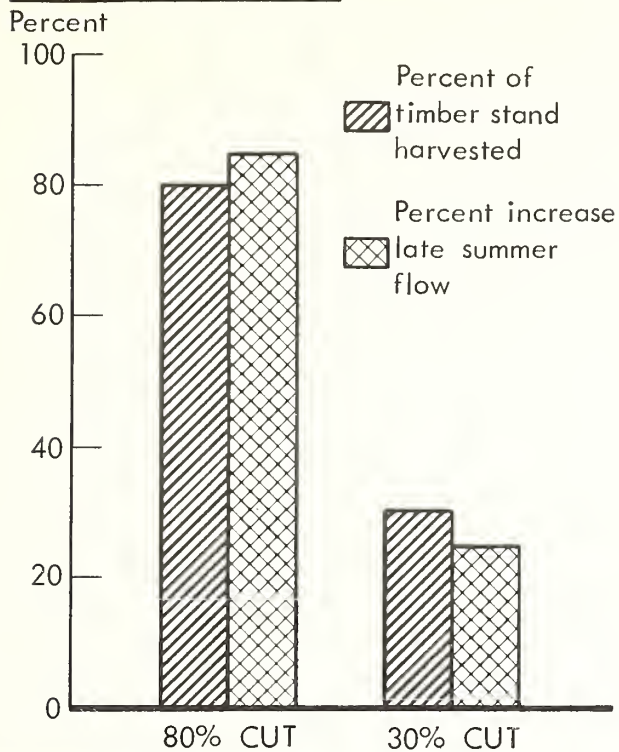
Increased forest cover reduces streamflow. On the Sacandaga River watershed in the Adirondacks above Hope, New York, a slow steady increase in forest cover has been correlated with a decrease in average annual, dormant season and April runoff over the 39-year period, 1912 to 1950. Beginning with an all-time low total forest stand density in 1912, caused by widespread logging, insect attacks and wildfires, the forest cover density increased up to 1950 as a result of complete protection but there was a corresponding decrease in average

annual streamflow of 7.7 inches. This shows that complete protection in the Adirondack Preserve has significantly increased the forest stand, but it has taken its toll of water. A multiple use program of management would provide some timber harvest, and water yields could be moderately increased.

Forest cover significantly affects design of road drainage systems.

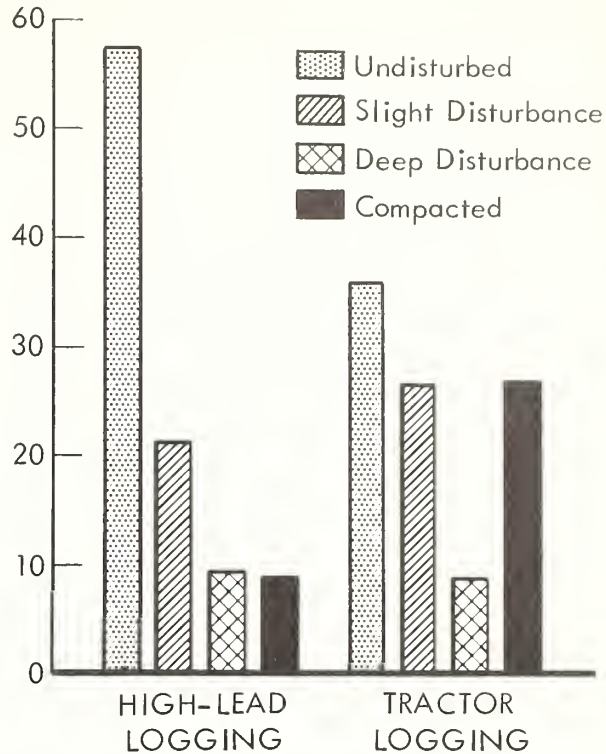
Comparisons of seepage flow of water out of the cut face of forest roads indicate that road drainage systems should be designed to carry about 30% more water during the peak snowmelt period where they traverse clearcut mountain slopes than where they traverse uncut forested slopes. Measurements of seepage flow made along forest roads at 6,400 feet elevation in north Idaho Engelmann spruce-fir forest show maximum hourly seepage flow rates per mile of road to be 5.96 and 4.60 cubic feet per second from clearcut and uncut forest, respectively. The variations in flow from the forest blocks are smaller and changes less abrupt than from the clearcut blocks. If roads are built for permanent use after logging is completed, they should be designed to accommodate post-logging volumes of water rather than prelogging flow.

Percent increase in late season streamflow related to timber harvest



Soil Surface Disturbance

Percent of total area



Alpine snowfields in late June which sustain streamflow through July and August.

(17) Range Management Research \$1,267,000

An increase of \$9,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Range Management Research aims to find the best and most practical means to manage, improve, and maintain the productivity of forest and related lands used for grazing domestic livestock. It encompasses a variety of activities including: (a) determination of management systems, grazing intensities, and proper coordination with other uses for the many different range types and conditions; (b) development of range improvement measures such as conversion of low-value vegetation to desirable forage plants through prescribed burning; (c) determination of characteristics, responses, and requirements of range vegetation; and (d) rating and classification of range condition and trend through studies of plant ecology, physiology, and taxonomy.

In the United States grazing is the largest single use of land and as such constitutes a substantial portion of the agricultural economy. About half the total land area of the contiguous 48 States, some 940 million acres, is grazed by domestic livestock, and all of it is important for its wildlife values. These lands furnish forage for about one-half of the beef cattle and three-fourths of the sheep for at least 6 months of the year. Rangelands are also important watersheds which supply a substantial portion of the Nation's water, and they provide a wide variety of recreation opportunities.

Well-managed ranges supporting vigorous stands of vegetation are interesting and beautiful, but vast areas have been damaged by past grazing practices to the point, that forage, watershed, and recreation values have been seriously impaired. In the West, these lands pose many problems because of the variable and often droughty climate, highly erodible soils, and vegetation that will not withstand close grazing use. In the South, integration of grazing with timber production poses a particularly complex problem but also an important opportunity. Here there is increasing interest by private forest-landowners in grazing use as a source of annual income while waiting for timber stands to reach harvestable age. Furthermore, use by wildlife on all lands has to be carefully correlated with livestock grazing. Methods of management and improvement practices must be found to allow continuous forage production in keeping with other uses and values.

Examples of Recent Accomplishments

Grass-shrub cattle ranges can be improved by periodic deferment. By deferring grazing in alternate years until the end of the summer growing period and utilizing perennial grasses 40%, allowable stocking was increased 62% between 1954 and 1961 on two range units of the Santa Rita Experimental Range in southern Arizona. These benefits were obtained without killing mesquite. On two other units in which practically all mesquite were killed in 1954 and 1955, allowable stocking increased 169% over the following 7-year period.

Project (17)

The increases in stocking were equivalent to 8 and 17 head of cattle per section, respectively, on the mesquite-infested and mesquite-free units. Though summer rainfall varied greatly from year to year during the study, it showed no definite trend and apparently was not responsible for the improvement in range condition.

These results indicate that grazing management alone can improve semidesert grass-shrub cattle ranges; when improved management is coupled with mesquite control, even greater increases in grazing capacity may be expected. (See Figure P-3.)

Grass yield per inch of rainfall a useful index to productivity of southwestern ranges. Knowledge of the amount of grass produced per inch of summer rainfall has proved to be useful at the Santa Rita Experimental Range in evaluating the comparative productivity of two or more range units, and in determining trend in production of any given unit. Because production of perennial grasses on southern Arizona rangeland varies widely from year to year, not only with condition of the range but with the amount of rainfall received during the growing season, trend in range productivity is generally obscured. For example, as shown in the accompanying chart, the amount of grass produced per acre was much higher in 1958 than in 1954, and much lower in 1962 than in 1958, yet no trend in production is indicated. (See Figure P-4.) When the amount of grass produced each of the 3 years is expressed in pounds per acre per inch of summer rainfall, however, a definite upward trend in production is revealed. Such information assists the rancher or range administrator to direct present management toward maintenance of long-range productivity.

Mixed grass-shrub ranges are best for year-round sheep production in Idaho. On sagebrush-grass range in eastern Idaho, normally used in the spring and fall, sheep grazed during the summer months showed a high preference for grasses instead of weeds and shrubs. Grasses remain green later in the season and consequently are more palatable than the weeds, which are mostly dry by early July. Shrubs are most palatable and nutritious in the fall when both grasses and weeds are completely dry. A mixture of species is apparently essential for seasonlong use of this type of range and it is only on such ranges that maximum year-round production can be attained.

Sherman bluegrass promising for extending green feed period. Sherman big bluegrass (*Poa ampla*) continued to outproduce other introduced species at Manitou Experimental Forest in Colorado during 1963-64, despite rather severe drought. Average (6 years) beef production from this species, singly or in mixture, is now 88 pounds per acre. Average grazing capacity for Sherman big bluegrass is now 58 animal-unit days per acre, nearly twice as much as for crested wheatgrass, intermediate wheatgrass, Russian wildrye, smooth brome, and other grasses, as found in an experiment to determine ways to extend the "green feed" period beyond that of native grasses.

Continuous grazing superior to seasonal on California annual ranges.

On natural, unimproved annual-plant rangelands in California, year-long continuous grazing at a moderate rate is proving superior to seasonal grazing for the maintenance of breeding cows. Under yearlong continuous grazing, young cows developed faster in body weight and were consistently heavier throughout all seasons of the year than those under repeated-seasonal and rotated-seasonal systems of grazing. Between ages of three and six years, cows on continuously grazed areas averaged 75-120 pounds heavier than cows on seasonally grazed areas. Differences in calf weights have been neither so striking nor consistent, but the trend in cow weights is indicative of the best grazing system for calves.

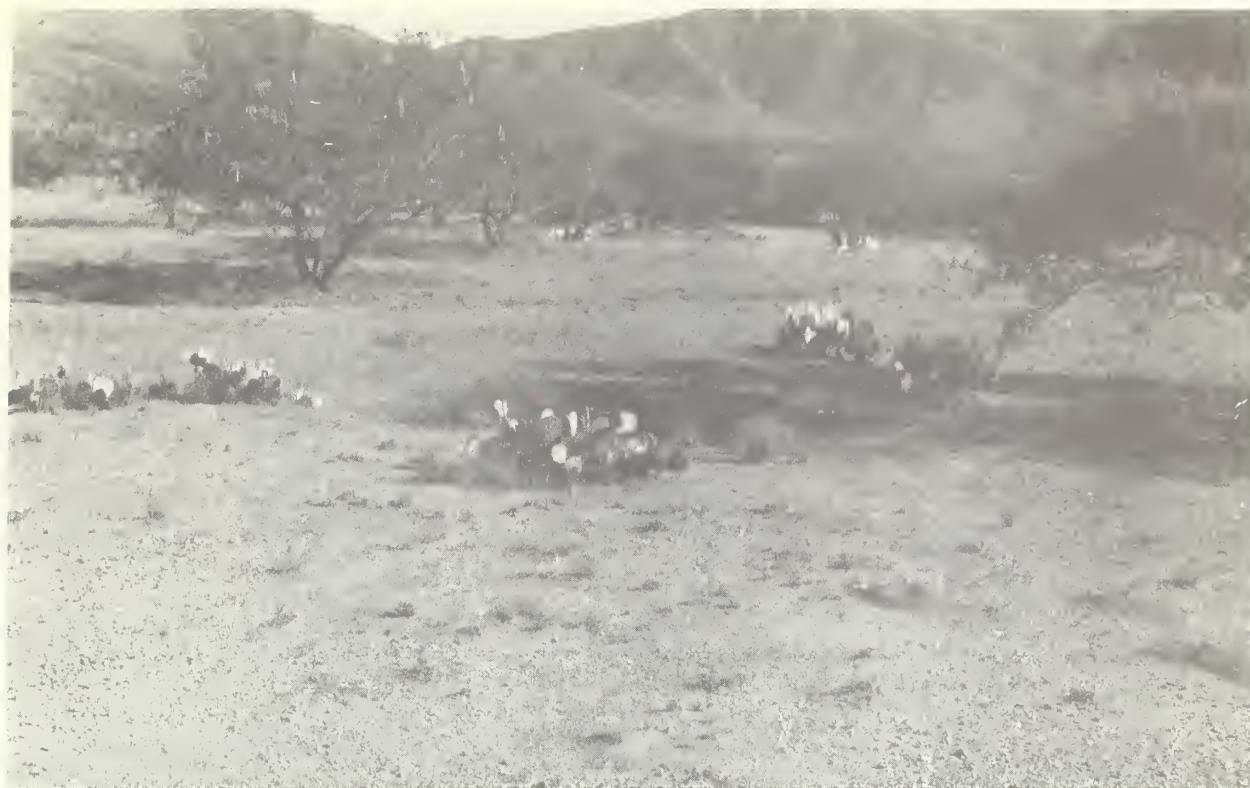
Proper livestock stocking rates essential to good land management in Louisiana.

In a 12-year study on longleaf pine-bluestem range in Louisiana, herbage utilization averaged 67% under heavy grazing and 46% under moderate. Grass yields averaged 3,350 pounds per acre under heavy grazing, 3,240 pounds under moderate grazing, and 2,650 pounds with no grazing. During the period of study, grass cover declined under all grazing intensities, but it decreased most on ungrazed range, probably because of increased crown canopy and the buildup and smothering effect of litter or "rough." Greatest losses were in slender bluestem (Andropogon tener). Pinehill bluestem (A. divergens) increased on ungrazed range, decreased on heavily grazed areas, and remained about constant with moderate use. Carpetgrass (Axonopus affinis), an invading but desirable species, increased greatly on heavily grazed range. Moderate stocking stimulated production as much as heavy grazing, without the drastic changes in vegetation, and proved less damaging to pine regeneration and soil conditions. Stocking the range to the proper number of livestock is essential to good land management.

Late fall grazing by sheep may control big sagebrush. Grazing by sheep in late fall shows promise for controlling invasion of big sagebrush into stands of crested wheatgrass, if grazing is started before brush stands become dense (not more than three or four plants per 100 square feet). Big sagebrush declined about 20% between the second and third year of late fall grazing by sheep; in contrast it increased more than 50% under early spring grazing by cattle.

Findings reported on forage improvement practices for Ozark ranges.

Brushy Ozark ranges can be improved by aerial spraying with 2,4,5-T, seeding with introduced or native forage plants and, in the case of introduced species, by fertilizing. Reducing the hardwood overstory with 2,4,5-T, is not enough; seeding of forage plants must follow because desirable native species are usually too scarce to regenerate. Three years after spraying and seeding, forage production per acre increased from less than 50 pounds to about 1,500 with seeded native grasses and to 1,100 pounds with a tall fescue-lespedeza mixture. Application of 320 pounds of 8-24-8 fertilizer per acre to the fescue-lespedeza mixture increased production threefold. Production of native grasses was not increased by fertilization.



BOTTOM: Proper grazing and mesquite control were responsible for the high productivity of this semidesert range shown in 1961. TOP: The same range in 1953 before range improvement practices were begun.

Figure P-3

Production of perennial grass, expressed in pounds per acre per inch of summer rainfall, reveals upward trend in the productivity of a semidesert grassland despite the low grass yield of the last year.

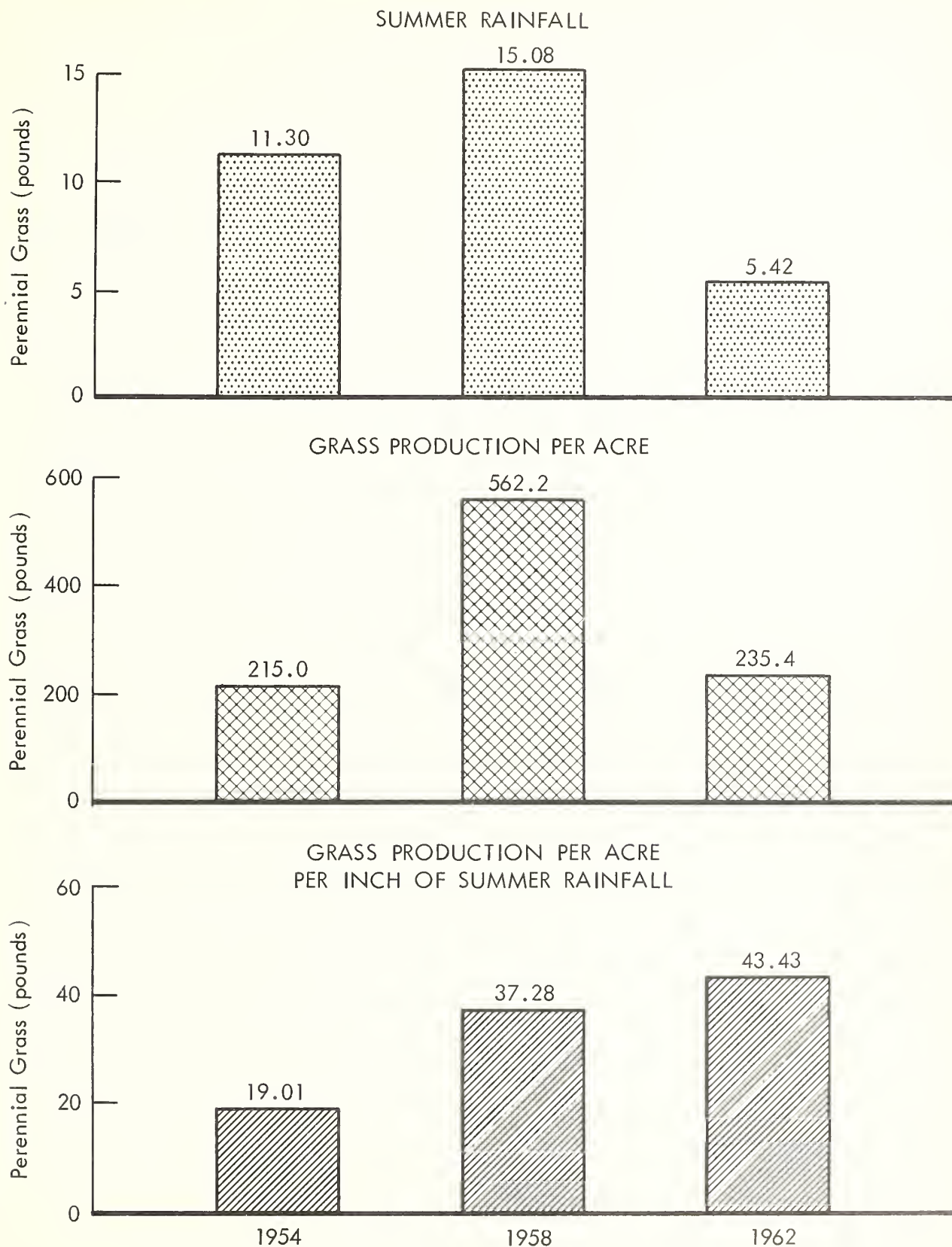


Figure P-4

(18) Wildlife Habitat Research \$735,000

An increase of \$5,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Wildlife Habitat Research is concerned with the development of management and improvement practices for supporting optimum populations of game and fish in harmony with other uses and values. Each kind of animal has specific habitat requirements that must be balanced against requirements for production of water, timber, and forage for livestock. Special practices are developed for increasing game food and cover by seeding, planting, burning, spraying, and fertilizing. As a basis for successful integration of wildlife, livestock, and timber production, the nature and degree of competition between wildlife and livestock are determined for various types of forest and rangelands, as well as effects of silvicultural and timber harvesting practices on food and cover plants and reciprocal effects of forage production and wildlife grazing on timber reproduction and growth. Research on fish habitat improvement includes studies of regulating shade and water temperatures through manipulation of streamside vegetation, creation of gravel spawning beds, and stabilization of channels.

The Nation's forest and related rangelands provide the main habitat for an estimated ten million big-game animals as well as for countless numbers of other species of wildlife. These lands, too, are important fish habitat. All are a source of interest and beauty. Demands by hunters, fishermen, and nature enthusiasts are ever-increasing. National Forests alone contain over 80 thousand miles of fishing streams and nearly two million acres of lakes. Although habitat conditions on some areas are suitable for supporting high wildlife and fish populations, the capacity of most forest and related rangelands can be materially increased. Some of the low-producing areas, often an ugly picture of land abuse, are the result of damage from poor logging practices, fire, or overuse by livestock or big game, whereas others are due to the development of vegetation that is naturally unproductive for wildlife. Range improvement practices, such as seeding and plant control by prescribed burning or use of chemical herbicides, may have beneficial or adverse effects on habitat, depending on the wildlife species involved. Deterioration of riparian vegetation and accelerated soil erosion have resulted in unfavorable water temperatures, excessive stream siltation, ruined spawning beds, unstable channels, and exposed banks. Consequently, many streams flowing through these lands are below their potential for fish production. Information on ways and means to manage and increase habitat productivity is needed by small woodland owners, as well as large forest industry landholders and public land administrators. Wildlife resources are ever-increasing in monetary value to private landowners through sale or lease of hunting and fishing privileges. The wildlife habitat research program involves active cooperation with Federal (particularly the Fish and Wildlife Service) and State fish and game agencies and educational institutions.

Examples of Recent Accomplishments

Repellents effectively protect shrubs from overbrowsing by deer. Restoration of desirable shrubs on overbrowsed deer ranges is a difficult problem because the animals devour the young seedlings as soon as they appear. Improved ZIP (zinc dimethyl dithio carbamate cyclohexylamine complex in a Rhoplex base) and TMTD (tetramethyl thiuram disulfide in adhesive base) offer promise of protecting young shrubs from browsing by deer until the plants have grown large enough to provide browse in sizable quantity.

Each of these deer repellents, developed by the Denver Wildlife Research Laboratory, U.S. Fish and Wildlife Service, was sprayed in the fall on new shoots of randomly selected chokecherry and quaking aspen on heavily used winter deer range in the Black Hills of South Dakota. Current twig growth of chokecherry sprayed with ZIP was browsed only 0.3% during the ensuing winter, whereas adjacent unsprayed plants were browsed 25%. (See Figure P-5.) Treated aspen showed similar results.

How long the repellents will remain effective is not known. However, protection of young shrubs even for one winter may obviate the need for costly wire cages or deerproof fences in pilot plantings.

Seed source important in game range restoration. Knowledge of seed source of native browse species and its effect on herbage production is essential in establishment of the most effective plantings. Studies of production of adaptable game forage plants for winter range are now being undertaken in central Utah. Fourwing saltbush (Atriplex canescens) provides an example of progress on two favorable sites. Under irrigation, plants of fourwing saltbush from seeds of the highest yielding source (New Mexico) produced 2.4 times more herbage than those from the lowest yielding source (Nevada). Without irrigation, yields from New Mexico and Nevada sources were nearly equal, and plants from the local seed source (Ephraim) produced highest yields. Apparently much progress will be possible through selection of superior strains of such species.

Chemical herbicides aid deer range improvement in Ozarks. A single aerial spraying of Ozark woodlands with 2,4,5-T killed more than 70% of the low-quality hardwood trees. Grass yields were greatly increased the first few years after spraying but declined as browse growth increased. Yields of the weeds preferred by deer were little affected by spraying. The yields of preferred deer browse plants initially reduced by spraying, soon recovered to greatly exceed those on unsprayed woodland. If deer habitat is the main consideration, spraying should be less frequent than 8-year intervals and in alternate strips or small blocks.

Deer prefer hardwood sprouts to seedlings in North Carolina.

Harmonizing deer use with timber regeneration is often difficult. Knowledge of what and how deer browse is essential for good game management. Three years after extensive heavy selection cutting of hardwoods in North Carolina, tree seedlings made up about 80% of the regeneration, yet deer preferred sprouts which grew on the old stumps. Approximately 60% of the sprouts were grazed as compared to 10% of the seedlings. Although the deer population is fairly high in this area, adequate forest regeneration is apparently assured. Sprout production can be increased by deliberately cutting trees of poor form or non-commercial species.

Guides developed for coordination of livestock range improvement with big-game habitat requirements. In pinyon-juniper habitat of southwestern New Mexico, elk and deer were found to prefer similar but specific sites. Heaviest use was on northeast exposures. Lightest use was on level sites. Slopes in excess of 15% were used as heavily as more level topography. In general, habitat use was related to abundance of birchleaf mountain-mahogany and Wright silktassel. Findings suggest that livestock range improvement and deer and elk habitat preservation can be coordinated by confining clearing of pinyon pine and juniper for range improvement to slopes of less than 15% and leaving existing cover on northeastern exposures. Also thinning of relatively dense stands of trees may improve elk and deer habitat, especially where palatable shrubs are present in the understory.



Effectiveness of the repellent, TMTD, in reducing browsing by deer is revealed by these chokeberry plants. TOP: Unsprayed. BOTTOM: Sprayed.

Figure P-5

(19) Forest Recreation Research \$519,000

An increase of \$3,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Forest Recreation Research involves investigations of the impacts of people on forest resources and determines how the great variety of outdoor activities can best be fitted into timber, water, range, and wildlife habitat management. The information obtained is used by recreation planners to insure sound development of programs and facilities for recreation in all of its forms and by forest managers to get the fullest use out of the forest resource for which they are responsible. Research is also concerned with finding how private landowners can develop and manage their forest properties as profitable commercial recreation enterprises.

Recreation research is contributing to retention of natural beauty in managed forests by identifying for the forest manager the key factors in the landscape that must be developed to get the greatest overall values from a multiple use forest.

Illustrative of the questions being answered by recreation research scientists are these: How can heavily used areas be restored and maintained so they may be continually enjoyed? How can necessary recreation facilities be blended and harmonized so as not to detract from the natural setting? Progressive changes in natural vegetation can profoundly alter the landscape. What management measures will help maintain the most desirable plant and animal communities? Beauty and enjoyment are closely related. Some recreation uses are not compatible with others. How can these be separated and each enjoyed?

In 1930, the National Forests received about 5 million visits. This year the number may exceed 150 million. Other public and privately owned forest recreation areas are receiving similar increases--and additional millions of Americans can be expected to come to the forests for their recreation enjoyment. This burgeoning use has created new and greater opportunities for private income and employment, as well as management problems that cannot be effectively solved without supporting studies that are soundly organized and carried out. Forest recreation must be coordinated with increasing demands for water, timber products, wildlife, forage, and other forest resources. Especially in economically depressed rural areas there are opportunities for income-producing recreation for small farm-woodland owners. Forest recreation research is aimed at answering all of these questions.

Examples of Recent Accomplishments

Privately owned campgrounds meet the needs of campers in New Hampshire. In recent years, the private forest campground industry has grown by leaps and bounds in New Hampshire. There were 12 such campgrounds in 1955 but 108 in 1964. However, many of these enterprises have been unsuccessful. A cooperative study by the Forest Service and the New Hampshire State Planning Project showed why and identified some of the key elements for a successful private campground development.

Many campers prefer the kind of conveniences often afforded on private campgrounds. In fact, those who sought out the 108 New Hampshire privately operated camping spots preferred them over public campgrounds two to one. Their reasons included such features as opportunity to make advance reservations, more conveniences such as hot showers and electricity, entertainment, recreation facilities such as horse-shoes and softball, and even baby sitting services.

Few of the New Hampshire campgrounds were used to capacity. Only 10% were full throughout the season. Thirty-five percent were full on weekends but often empty the rest of the week. The remainder were half full or less most of the time. The failure of some campgrounds to attract more users may react as a deterrent to the campground industry--and at a time when all signs point to a continued expansion in camping demand. Lack of adequate preliminary planning has appeared to be a major failing in several instances.

The impetus for development of privately owned campgrounds has stemmed partially from the inadequacy of public areas to meet the demand. However, we found that many of the owners had gone into the business because of the romanticism associated with outdoor recreation. Less than one-fourth of them had sought the services of a private or public planning consultant to evaluate the market, or for information regarding campground layout, costs of development, operating expenses, and potential income. Even less had obtained published material to guide them in their campground planning.

The study pointed up the opportunity for well-located, well-managed campgrounds with adequate facilities operated by a person who recognizes that campers are becoming more sophisticated, who takes an active interest in his clientele, and is alert to their differences and needs. (See Figure P-6.)

Campground planning should give more consideration to the visitors' different activity interests. A study of 12 campgrounds in Oregon showed that campers tend to group themselves into specific activity aggregations such as for fishing, nature study, swimming, and water skiing. Often the requirements of one aggregation are incompatible with those of another. Unplanned or forced intrusion of one activity on another can alter the complexion of use, demand on the site, level

of satisfaction, and can often create antagonism toward the administrator. The nature study camper usually wants wide spacing and tranquility. The water skier seems to like company near his camp (provided the company is that of fellow skiers) and often complains that the camp's boat launching facilities are inadequate. The activities of swimmers, fishing groups, and nature study groups, on the other hand, are hampered if large boats and water skiing are permitted nearby. As a result, the forest manager who has provided a standard campground to serve all of these groups often finds he is not adequately serving anyone.

None of the 12 campgrounds studied were specifically planned for the activity to which they were host. A standard layout had been provided in the belief that its facilities would be flexible enough to meet a broad range of needs adequately. The results of this study indicate that more specialization could profitably have been recognized at the time of campground establishment. Publicity can assist in directing campers to specialized facilities of their choice. The needs of diverse segments of the public can be met through a balanced combination of these more specialized units.

Few species of plants withstand heavy recreational use. Maintenance of ground cover in campgrounds is a critical and universal problem. Research is answering three important questions in this connection: What degree of use can be safely tolerated without dangerous deterioration of natural vegetation? What plants "stand up" the best? What measures can be used to keep vegetation healthy?

A study in Pennsylvania showed that with only two campers per day per campsite during a 100-day season, 60% of the ground cover was destroyed. With one camper per day, losses were only 10%. Plants like wild strawberry, violets, and moss disappeared quickly after very little use. Others like pathrush and Canada bluegrass are resistant and tolerate trampling and soil compaction.

Arizona and Utah studies indicate that quaking aspen is one of the better campground species. In areas of heavy camper use, many conifers disappeared, but aspen increased. (See Figure P-6.) Furthermore, aspen responded favorably to fertilization and irrigation. Treated trees were more vigorous and their growth rates were increased 17 to 36% over the untreated control trees.



Privately owned campgrounds in New Hampshire were profitable when they were well located, had adequate facilities, and were well managed by owners who were alert to the interests of their customers.



Despite substantial abuse, aspen seems to be able to thrive better than conifers in heavily used campgrounds.

Figure P-6

(20) Forest Fire Research \$2,880,000

An increase of \$20,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Forest Fire Research develops the basic knowledge, techniques, and methods for control of forest fires, needed by State, private, and Federal forest protection agencies throughout the United States. These agencies annually combat some 100,000 forest fires. The research includes investigation of fuels and fire behavior; physics and chemistry of combustion; environmental variables such as lightning storms which influence ignition and rate of fire spread and intensity; methods for prevention, detection, and suppression of fires; techniques for hazard reduction; and methods for prescribed use of fire in forest management. Some phases of the research require highly sophisticated laboratory equipment and techniques. Others involve field studies dependent on intricate systems of instrumentation.

Forest fires annually cause enormous losses of commercial timber, scenic beauty, wildlife, range, and outdoor recreation resources. Improved property and human lives are endangered by the continued expansion of residential areas into the forest. Heavy recreational use increases the possibility of fire starting as a result of human carelessness. For these reasons there is continuing pressure for more effective means of preventing fire occurrence, for more prompt mobilization of resources for attack, for better equipment and tactics for fire suppression, and for information on measures that can be employed in advance to reduce the possibility of widespread conflagrations.

Examples of Recent Accomplishments

Laboratory scale fires simulate conflagration causes. One of the most difficult problems in fire research is the study of rapidly spreading and fiercely-burning forest fires. Up to now, no satisfactory method has been found to determine the importance of each factor that contributes to what firefighters call "blow-ups." The modern facilities in the new Forest Fire Laboratories are now enabling research scientists, however, to experiment on a small controlled scale. Measurements of test fires can be made so that mathematical models can be constructed. From these the researches can predict the behavior of large fires burning under natural conditions. The results are being used in planning more effective and safer fire control operations.

Electronic fire surveillance systems provide faster and better fire control. Preliminary research results with a newly designed airborne infrared scanning system show good ability to detect tiny fires in forests. With this system, fire detection is possible at night and through dense smoke when conventional methods often fail and cause costly delays in firefighting. Tests on several large fires have also demonstrated the ability of airborne infrared scanners to map fire perimeters, locate hot spots, measure fire spread and provide

Project (20)

intelligence on fuels and terrain. As a result, fire control action can be planned and executed faster and more precisely. With the aid of these new research developed electronic "eyes," fire control operations should enter a new stage of efficiency and result in significant savings of forest resources.

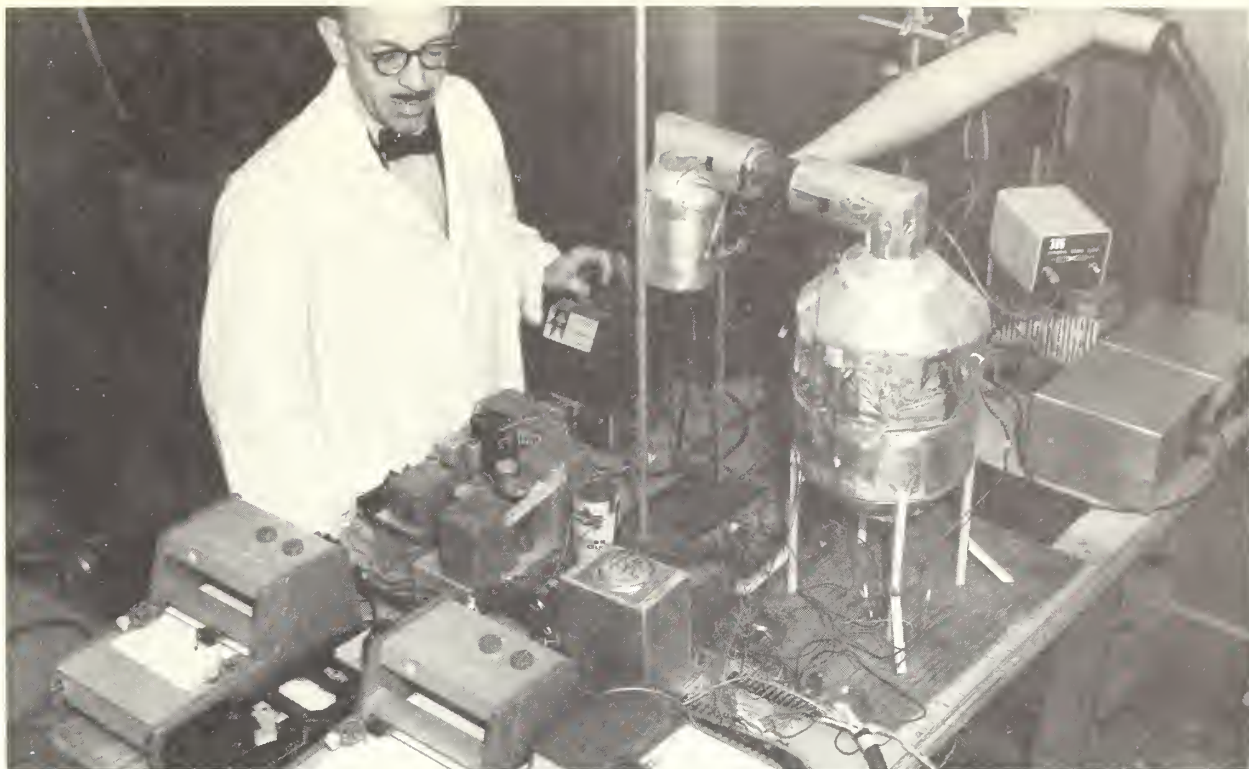
New fire prevention signs. More and better roads through our forests continue to speed the pace of forest traveling public. A study last year demonstrated that many of these people either did not notice our conventional signs or did not get from them the message intended. Roads in a companion test area were posted with signs that minimized words, enlarged lettering, carried symbols and used eye-catching colors. Preliminary analysis shows a sizable increase in public response to these new sample signs. The problem of designing the optimum sign for each needed message, however, still lies ahead.

Fire retardant technology is improving. A laboratory apparatus has been constructed that measures both the radiative and convective energy emitted by small samples of burning fuel. By comparing untreated fuel samples with those to which fire retardants have been applied, the effects of different chemicals on the combustion process may be determined. (See Figure Q-1.) Such laboratory studies are faster, more accurate, and cheaper than full-scale field tests.

When fire retardants are dropped from aircraft, the plane must fly low enough so that the chemicals do not disperse in the air stream. Addition of new viscosity agents allow accurate, effective drops to be made from higher altitudes with a consequent increase in pilot safety. Ground firefighters are also benefiting from these new chemicals which are easy to handle and require no specialized equipment.

Fuel break systems help fire control operations. Large, unbroken bodies of flammable fuels, often the spawning ground for fire disasters and costly firefighting operations, are being treated with new research developed systems of fuel breaks. As a result of rapid application of research results, more than 1,500 miles of fuel breaks have been constructed in California alone. Fuel break experiments are now being planned in the Intermountain west and in eastern forests. Research is also progressing on techniques for the establishment of less flammable vegetative cover on fuel breaks in high value watershed areas.

Guidelines for burning heavy slash. Thousands of acres of slash in the West must be burned each year following clear-cutting to pave the way for a new tree crop and to reduce the fire hazard. Study of the moisture contents of heavy materials like cull logs has helped to show how and when to burn to get a good job done without undue threat of fire escape. (See Figure Q-1, bottom.)



This apparatus measures differences in heat output when sample fuels are treated with different fire retardant chemicals.



This apparatus measures the moisture content of the log on a slash-burning test to determine the best time to burn.

Figure Q-1

(21) Forest Insect Research \$3,883,000

An increase of \$27,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Research on forest insects is directed toward the prevention and control of destructive insect attack on forests and forest products. Damage by insects enters into all phases of forest management from the seed to the mature forest. The development of effective and economical methods of direct and indirect control is dependent upon thorough knowledge of life histories and habits of forest insects, including the interrelationships between the insects and their environments. Control of forest insects by indirect methods such as the use of native or introduced parasites, predators, and diseases of insects; by silvicultural practices designed to prevent the buildup of insect epidemics; and by radiation and chemosterilization techniques, offers promise and is being given major emphasis in the research program. Investigations on direct control methods involve mechanical and chemical methods, including development of safer chemical insecticides and systemics.

Included among the many insects under investigation are: (1) those that kill trees outright, such as the bark beetles which cause heavy losses in the West and South; (2) a wide variety of species that feed on the foliage of trees and either kill them outright or reduce their vigor and growth, such as the spruce budworm and gypsy moth; (3) species that damage or destroy the flowers, seeds, and cones of trees; (4) borers that tunnel into the wood and reduce its value through degrade; (5) borers such as termites that damage or destroy valuable forest products, such as logs, lumber, and pulpwood; and (6) various species that damage or destroy young trees in forest plantations, such as the European pine shoot moth. No part of the country is immune to the ravages of these insects, and no year passes without one or more of them occurring in epidemic form.

Insects are responsible for tremendous losses to forest, shade and road-side trees, to forest products, and to woody plants on game ranges and recreation areas. The enormity of the loss is difficult to grasp. For example, during an average year insects kill enough commercial sawtimber alone to build over a half million average-size homes. They also exact a heavy toll among trees of smaller size, killing at least a billion cubic feet and reducing the growth of surviving trees by three-quarters of a billion cubic feet. Great as these normal losses are, they become far greater during periods of epidemics which occur frequently and unpredictably. Losses are not confined to timber values alone. Sites are impaired, watersheds are damaged, fire dangers are increased, wildlife habitats are changed, and the beauty and serenity of parks and recreational areas are reduced or destroyed. Products of the forest, including logs, lumber, and pulpwood are attacked by a wide variety of insects and the losses they cause are also extreme, both before and after they have been processed and placed in structures. These losses of the Nation's forest resources grow less tolerable by the year, as the values at stake continue to increase.

Examples of Recent Accomplishments

Chemical and biological control effective against hemlock looper.

Studies of the biological enemies of the hemlock looper have revealed that chemical control may be applied with no injury to the primary parasites. Of the seven insect species found parasitic on the looper, the two primary parasites attack the pest when it is in the late larval stage. During outbreaks when control is needed, chemical treatment is applied against the young early stage loopers at the time parasites are inactive. Thus, there is no killing of the primary parasites. They are maintained in the environment and later parasitize loopers which might have escaped the spray and thus they tend to delay the development of outbreaks in years following the spray treatment.

Virus disease causes decline of outbreaks of Douglas-fir tussock moth.

Research on the nuclear polyhedral virus disease of the tussock moth in the Northwest indicates that the disease plays an important role in the termination of outbreaks of the pest. The virus was isolated from diseased larvae found in the forest. Studies showed that the disease kills a large proportion of the very young tussock moth larvae. A second wave of mortality affects later larval stages. In outbreaks in the State of Washington, few larvae reached maturity. The polyhedral disease of the very young larvae appears to be caused by surface contamination of the eggs. Research is in progress to determine the biology and behavior of the virus and how and when it should be applied to tussock moth infestations to achieve best control. (See Figure Q-2, top.)

Elm bark beetle responds to feeding stimulant isolated from elm bark.

A feeding stimulant has been isolated from dry powdered elm bark and found to create a positive response by the smaller European elm bark beetle. This insect is the primary vector of the destructive Dutch elm disease; it inoculates trees as it feeds on bark of young twigs. Isolation of the stimulant may provide a chemical basis for explaining host selection by the beetle and ultimately contribute toward a control by trapping beetles or by chemical or biological means.

Sex attractants isolated from pine bark beetle. A breakthrough in research on the highly destructive pine bark beetles has been made by scientists of the Stanford Research Institute under a recently executed grant. Two chemical compounds that are active sex attractant ingredients of male beetles (Ips confusus) have been isolated and identified. The discovery will ultimately lead to a better understanding of bark beetles, their behavior and the factors leading to outbreaks. The principles and techniques developed in this research will undoubtedly lead to discovery of attractant compounds from other pine bark beetles and perhaps other insects.

New, safe, non-persistent insecticides show promise against defoliating insects. Promising results in the evaluation and development of safe, non-persistent insecticides are being obtained at the recently established chemical screening project at Berkeley, California. Preliminary evaluation of 53 different materials for control of destructive leaf-feeding insects has been completed. Several chemical formulations gave higher contact toxicity than insecticides used against these insects in the past. They are non-persistent with characteristics which should allow their use with little or no effect on other organisms in the environment. A stabilized pyrethrin formulation has proven particularly successful in the laboratory; it will soon undergo field testing and evaluation. The new compounds are presently being tested against the Douglas-fir tussock moth, the spruce budworm, and the pandora moth. (See Figure Q-2, bottom.)

Proper timing important in control of southern pine beetle. Studies have revealed that direct control measures against the tree-killing southern pine beetle in the Deep South are most effective if applied in the fall, winter, and spring. Research on the seasonal variation in activity of the southern pine beetle in east Texas and central Louisiana shows that numbers and sizes of outbreaks increased most rapidly during April, May, and June. Beetles attacked the upper stem of trees during cooler months, the lower third in midsummer. Changes in host conditions, attack densities and abundance of natural enemies of the bark beetle accounted for much of the seasonal variation in brood establishment and development. Prolonged high temperatures limited dispersal and survival of the beetle during midsummer.

Long-term population studies indicate better control means against gypsy moth. Analysis of a 21-year record of gypsy moth abundance in Massachusetts, Maine, and New Hampshire and a 6-year record for New York provides a basis for evaluation of infestations and proper selection and timing of control techniques. Life table data, dissected and analyzed through a series of mathematical models, revealed these facts: Variation in adult sex ratio was an important determinant of population trend from year to year; the sex ratio was determined largely by disease affecting large male and female larvae and disease and parasites affecting pupae. Incidence of disease and parasites was in turn determined by the population density of the gypsy moth; they were negligible when moth population was low. Thus control of heavy moth outbreaks may best be attained by environmental manipulation to encourage disease or by introducing a supplementary disease organism. Outbreaks at low levels may be prevented from increasing by maintaining conditions in favor of parasites and predators (including birds and small mammals) or through the use of sterilized or otherwise genetically altered male gypsy moths.

(22) Forest Disease Research \$2,096,000

An increase of \$15,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Research on diseases in forests and forest tree nurseries, and on decays and stains of forest products provides basic information on the causes of diseases and on practicable and effective methods of combating them. Thorough understanding of a disease must include the identity of the pathogen, its preferred hosts, life history and knowledge of the environmental conditions that lead to epidemic outbreaks. The development of disease controls through direct chemical or mechanical methods or through indirect manipulation of the host is a necessary function of research. Losses continue on wood products after their fabrication and research must learn how to prevent fungus infection in products and how to use treated or naturally durable wood to greater advantage through the use of improved designs and improved protectants.

Research on disease control provides the means by which basic information on disease is coupled to application of controls in the field. Controls may be obtained or improved through development of cultural practices favorable to forest trees and unfavorable to pathogens, selecting and breeding trees for genetic resistance, or discovery of safer and more efficient methods and materials for control. Research has shown the value of fire prevention, reducing logging wounds, and lowering rotation ages in reducing disease losses. It has shown that careful site selection and close attention to climatic influences can be of considerable importance to the future health of future stands. Biologic and economic studies of dwarfmistletoes have made it possible to integrate control with other timber stand improvement measures to improve forest yields. Studies on the direct application of chemical sprays and soil fumigants have greatly reduced the losses from foliage diseases and root rots in forest tree nurseries.

Improvement of disease survey techniques including timely recognition of potentially dangerous pathogens in foreign lands is an important part of the disease research effort. Disease-causing organisms that may be excluded by effective quarantines must be known so as to avoid another disastrous introduction such as the chestnut blight and to prevent additional costly control programs similar to those currently underway for the Dutch elm disease and white pine blister rust.

The Nation loses billions of board feet of timber each year to disease organisms in spite of the substantial progress in lessening their impact on the forest. Some diseases are intensified as the result of planting programs, particularly diseases occurring below ground and where a single tree species has been planted over extensive areas. Population pressures are bringing new areas of concern, i.e, air pollution damage to trees, the hazards of dead and dying trees in recreation areas, and the impact of disease epidemics on roadside beauty and other aesthetic values.

The program for 1967 will emphasize research on the physiological basis for disease and the understanding of the causal agents, their interactions, and the environmental conditions affecting their development. Work will continue on the effect of antibiotics on the blister rust fungus, the prevention of decay in wood and wood products, further research on the native rusts and dwarfmistletoes, and the causes of serious root rot problems of forest trees.

Examples of Recent Accomplishments

Replacement of Fomes annosus in roots. A serious root rotting fungus (Fomes annosus) can be replaced by a relatively non-pathogenic fungus (Peniophora gigantea) in roots and stumps of some southern pines. Many of the test fungi used were able to block growth of F. annosus in root sections but only P. gigantea was able to replace it. During a 2-month interval occurrence of the latter fungus had increased from 20 to 50% of observed root sections while the occurrence of F. annosus had decreased from 50 to 23%. Thus the tests proved rather conclusively that P. gigantea is important in replacing F. annosus in stumps even though initial stump infection by F. annosus was heavy. With such replacement the spread of rot through root contacts may be curtailed and perhaps fruiting and hence sporulation reduced.

Perfecting oak log fumigation. Several countries will not accept oak logs for import if they originate within the known range of the oak wilt disease in the United States. Efforts to develop a treatment that will render such logs safe for export have been quite successful. Methyl bromide is now known to penetrate oak bark readily and the wilt fungus has been killed in infected oak saw logs. (See Figure Q-3, top.) Research to date has been designed to determine minimum dosage, duration of treatment, and the temperature required for control. The immediate objective now is to reduce cost and closely define the economics of control using various combinations of known effective dosages, times, and temperatures.

A tool for detecting air pollution. Some plants have a particular affinity for certain soil types, soil moisture conditions or association with other plants. In many cases this affinity can be a useful indicator of the soil or moisture conditions once the plant-site relationship is known. In a similar manner, specific airborne toxic substances are known to cause definite disease symptoms on plants. Thus, plants expressing a given set of symptoms serve to indicate the presence of a specific air pollutant. The eastern white pine, for instance, has already been used to indicate low oxidant concentration in remote areas and the presence of sulfur dioxide and chlorine associated with industrial processes. (See Figure Q-3, center.) A system of carefully located plantings of susceptible pines should be useful in monitoring harmful concentrations of such air pollutants.

Pine susceptibility to chlorotic dwarf disease is genetically controlled. Eastern white pine susceptibility to chlorosis and dwarfing is related to the genetic makeup of the individual tree. Intergrafting of diseased and healthy trees revealed that the problem was confined to the foliage

and in no way related to the root system of trees. Branches grafted to growing trees retained the characteristics of their respective parents and did not assume those of the stock tree to which they were grafted. Thus healthy branches remained healthy when grafted to infected white pines. (See Figure Q-3, bottom.) Diseased branches retained their diseased condition when grafted to healthy trees. In some instances where chlorotic dwarf trees were terminally grafted with healthy branches the branches have outgrown the rest of the tree and have been able to nourish the previously small, spindly roots to the point where they are vigorous and healthy. Careful selection and weeding out of highly susceptible individuals promises effective control of this disease.

Causal fungus identified for canker disease of red and jack pine.

Damaging cankers on red and jack pines in plantations in northern Michigan were found to be caused by a fungus not found previously in America. The pathogen is serious on spruce and pine in western Europe and in recent years has been particularly severe on Scotch pine in nurseries. Field tests in Sweden have demonstrated that certain strains on the pine are more susceptible to attack by the fungus than others. In this country the potential threat is still unknown. The danger will be increased if the fungus is found to attack our native spruce and pines other than those species already known to be susceptible.

Chemically induced mutation of western white pine may yield resistance to blister rust. In selecting and breeding western white pine for resistance to the blister rust fungus an effective method of inducing genetic mutation of the host increases the likelihood of producing this resistance. Research has found that the chemical mutagen, ethyl methane-sulfonate, when applied after stratification of western white pine seed significantly alters physiological events such as time and percentage of seed germination and time of primary leaf development. Second year differences in coloration and size of foliage, and number of needles per cluster have been recorded. Seedlings from controlled pollinations appear more susceptible to change than do those from natural or open pollinations. With changes such as these the possibility of altering genetic resistance is definitely enhanced. Resistance will be tested by subjecting the seedlings to rust infection through artificial inoculations under ideal conditions for rust development.



Methyl bromide being applied under plastic to a pile of wilt infected oak logs.



This photo shows four grafts of eastern white pine taken from the same tree. The two grafts on the left were exposed for seven months in an area polluted by stack gas from a high-sulfur-coal-burning steam plant. The two on the right were exposed seven months in an unpolluted area.



On the left, normal growth of healthy white pine grafted on a chlorotic dwarf. Compare growth with that of ungrafted dwarf on the right.

(23) Forest Products Utilization Research \$6,505,000

An increase of \$428,000 is needed for the following purposes:

- (a) \$385,000 to broaden the utilization of Appalachian timber through defining more precisely the quality and character of the wood in logs and trees, advancing the development of fiber products from hardwoods, expanding the chemical use of wood residues with fertilizer, and improving the use of hardwoods in solid wood products.
- (b) \$43,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The aim of the Forest Products Utilization research program, which is carried on through the regional Forest and Range Experiment Stations and the National Forest Products Laboratory, is to contribute to the solution of national and regional utilization problems. Because of the nature and broad distribution of the forest resource, research to improve its utilization provides exceptional benefit to distressed and underdeveloped areas that are often characterized by an overabundance of low quality wood. This area of research is specifically focused on reducing unused woods and mill residues to a minimum by finding uses for present and potential residues; on developing new products; on improving the serviceability and lowering the costs of existing products; and on developing new utilization outlets for thinnings and unpopular and little used species of timber; in short, its aim is to make the whole timber crop on farms and other forest lands go further and give better service in a wide variety of uses for lumber, paper, chemicals, and other products derived from wood.

The timber-using industry is an important part of our present economy. In 1960 the total value of shipments from timber-based primary manufacturing industries amounted to over \$10 billion. About 6% of the gross national product originated in timber-based industries. One out of every 20 people employed in the United States worked in these industries. A raw material base for a greatly expanded industry is available in little used species, in low value timber, and in logging and milling residues. Research in forest products utilization is needed not only to give stability to the present industry but also to develop a technical basis for new industries.

Examples of Recent Accomplishments

New grading technique developed for Douglas-fir trees. A system for grading inland Douglas-fir trees has been developed to replace grades for cut logs and logs in standing trees. This new tree grading system has important advantages as compared with the application of log grades in standing trees, including ease of application, reduction in time required to evaluate each tree, and practical elimination of judgment considerations. Three simple measurements on the easily seen 16-foot butt section plus the merchantable height of the tree, provide all needed data.

Project (23)

The system uses a simple estimating equation to predict individual tree value based on standard lumber production. A 1,000-tree sample from a 4-State area indicates that the system predicts unit value at least as well as does grading each log in the tree when using the most accurate log grading system available. Its use requires only a minimum of training. These features will appeal to both public and private foresters of the West who have expressed a need for such an evaluation system.

Polysulfide pulping nears commercial evaluation. The high promise of the new Forest Products Laboratory (FPL) polysulfide process for substantially greater kraft-type pulp yields was brought much nearer to commercial realization at FPL during 1964 with the discovery of an efficient process for recovery of reusable chemical from the sulfur-enriched spent liquors. Polysulfide pulping promises up to one-fourth more pulp from a given amount of wood than is obtained by conventional kraft pulping. At current prices, the additional pulp would be worth some \$350,000,000 per year. The new recovery system reduces the hazard of polluting waterways with effluent and promises reduction of air pollution. There is no need for the lime kiln and causticizing system required in conventional kraft pulping, elimination of which may well offset the capital cost of the additional recovery-system apparatus. Pilot-scale and full commercial evaluations remain to be done in cooperation with industry.

Economical starch treatments improve paper. Starches and various chemicals are used to improve printing and writing properties of paper such as ink receptivity and fiber picking. They may be added when the stock is prepared for the paper machine or while the sheet is on the machine. (See Figure R-1, top.) FPL research during the past year established the optimum conditions for the use of starch to impart printing properties as well as strength to paper products.

The research showed that for such printing qualities as surface strength, opacity, and ink resistance, starch should be applied so that it will remain on the surface rather than penetrate into the sheet. On the other hand it was shown that penetration of chemical below the sheet surface improves certain strength properties without affecting sheet porosity.

The finding--previously unknown--that burst and tensile strength can be just as greatly improved by addition of 1 to 1.5% of starch to the surface as by twice that amount dispersed through the sheet thickness has obvious immediate application by industry, and it is already being used by paper manufacturers producing a variety of paper products. A 5% increase in efficiency in the use of starch will amount to an estimated yearly saving of \$5 million.

Properties of full-size building components determined with new methods. The widespread use of laminated structural members, trusses, and other building components has created a need for more precise determination of the strength properties of full-size elements used in these structural parts.

Heretofore, design criteria have been based on strength properties obtained by standard test procedures on small clear specimens of wood. Such test values must then be reduced for estimated effects of knots, cross grain, and other natural characteristics; for moisture content and service conditions; and by a factor of safety.

FPL engineers have now developed much more effective methods that permit testing full-size framing lumber in tension and in compressive end loading with lateral restraint. Both methods provide a basis for more efficient and economic design of wood structural members.

Oldest stressed-skin building construction evaluated. An experimental 2-story house built at the FPL at Madison, Wisconsin, in 1938 of then-revolutionary stressed-skin panels and since then used as office space underwent a final series of experiments to evaluate its structural condition before being dismantled. It was a prototype of a system of construction developed by FPL research engineers which has been widely adopted by the manufactured house industry. The unit panels are 4 by 8 or more feet in size, and vary in thickness depending on their use in floors, walls, or roofs. They consist of plywood sheets nail-glued to light lumber framework.

The house was subjected to forces simulating winds up to 125 miles per hour--a full-scale hurricane--by means of hydraulic winches. (See Figure R-1, bottom.) There was virtually no racking of the walls at right angles to the facade, nor was the structure noticeably raised from its foundation. The structural rigidity of the building after more than a quarter century of use was thus conclusively demonstrated--a convincing testimonial to the adequacy of the design concept.

New planing concept uses disk cutting head. Research at the FPL involving a new approach to the planing of softwood dimension lumber has resulted in a process for the production of flakes much more suitable for use in particle board than conventional planer shavings or chips. Key to the new concept is a disk or ring planer head with cutting knives fixed to its faces. It thus cuts across a face or edge of the stock being planed, rather than along the length. Flakes produced are quite uniform in length and thickness, rather than haphazard in shape and curled. The cutter does not produce so smooth a surface as does a conventional planer head, but highly acceptable surfaces can be obtained with a second cutter than has an abrasive action producing fine particles that have excellent potential for boards and molded products. Particle boards made from the new-type flakes were up to 50% stronger than those made from planer shavings and more dimensionally stable.

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An estimated 10 million tons of planer shavings are produced yearly in western dimension mills alone. Most are burned. Poor shape is chiefly responsible for their low value, about \$3 a ton, for pulp or particle board.

It is estimated that the uniform flake-like flat shavings produced with the new FPL cutterhead would be worth \$6 a ton for pulp or at least \$15 a ton for particle board. The fine, hair-like fibers removed by abrasive planing produced in the second step of the new planing method would also probably be worth up to \$15 a ton. If only one-half of the western shavings can be upgraded in value from \$3 to \$10 per ton, the annual economic gain would amount to \$35 million.

Fundamentals of the wood decay process confirmed by microscopic analysis. Better understanding of how fungi cause wood to decay was obtained at the FPL through microscopical studies of changes induced in a hardwood and a softwood by brown-rot and white-rot fungi. Findings were in accord with results of related chemical studies of the fundamental character and process of decay. Among significant microscopical observations were:

1. Decay of the cell wall does not depend on direct contact by the attacking fungus, but proceeds largely through enzymes secreted by the fungus, which can act upon the cell at a distance from the fungus.
2. White-rot fungi progress through the cell wall layer by layer, but brown-rot fungi can infect more than one layer simultaneously.
3. The amount of lignin in the cell wall apparently is a large factor in providing resistance to rot, the more heavily lignified walls of some types of cells having greater resistance.

The information will prove useful in perfecting improved means of protecting wood from fungus attack.

Density survey findings available for West and South. A major segment of the nationwide Forest Service wood density survey of standing timber--the entire 11-State Western survey--has been completed. Results of this research were detailed in a preliminary report that went to all interested agencies--industry, governmental, and educational. A companion report providing the basic data for the southern pine region was also completed and circulated.

Together these reports provide fundamental information on density, one of the important wood quality indices, for the major softwood commercial species in the United States. By far the most complete information on the specific gravity of forests anywhere in the world will thus be available as guides to the lumber, plywood, pulpwood, and related forest-based industries in planning utilization of timber.

The data for the West, coupled with strength analyses based on them, will find immediate industry application in the determination of new design stress ratings for use by engineers, architects, and builders in construction using lumber, plywood, laminated structural members, and poles and piling. These ratings are now under development by the American Society for Testing and Materials, which represents producer, consumer, and general interest groups.

Although data are not yet complete for the entire southern pine area, the results have already had wide application by pulpwood buyers, by manufacturers of southern pine plywood, and by southern pine lumber manufacturers and users generally.

New sawing method produces more high-grade studs from southern pine. Key to an improved (FPL) method of sawing lumber is the positioning of the logs so that the weak pith wood is confined to a single wedge-shaped piece from the central area of the log. This piece is discarded as residue. Pith wood shrinks and swells longitudinally much more than normal wood; hence, lumber warps out of shape if pith wood is present in unbalanced proportions.

Proof that this method of sawing substantially reduces the amount of warp developing in 2 by 4 studs cut from loblolly pine was amply provided by experiments on logs obtained from Georgia.

Production of No. 1 and better studs from butt logs sawed by this method was 47% greater than from conventional methods of sawing widely practiced throughout the South. Upper logs yielded 7% more No. 1 grade.

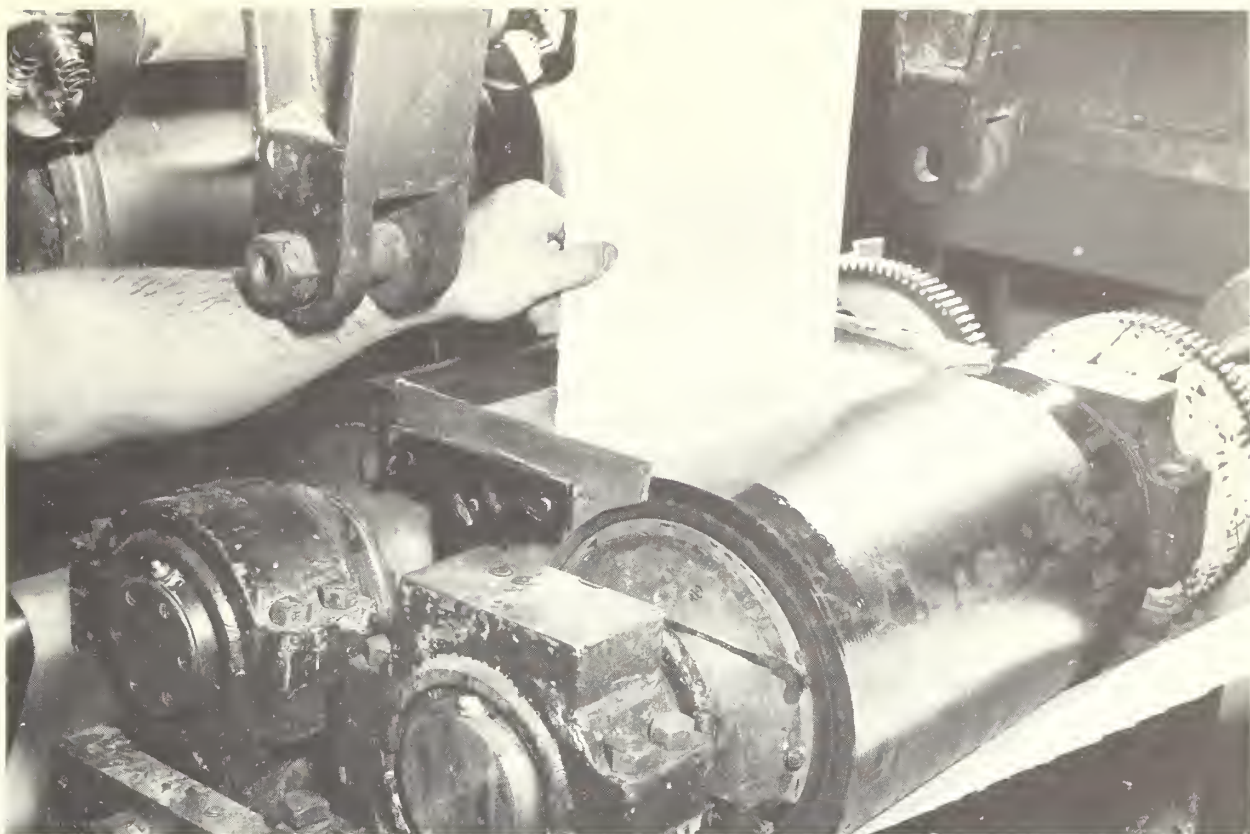
The 2,300 studs involved in the study were stress rated by the criteria used in mechanical grading machines. Those produced by the FPL sawing method averaged 10% higher in stress rating. This indicates that production of top-grade studs would be increased by 20% or more and the rejects reduced by a similar percentage.

The increase in value of output would mean an additional daily profit potential of \$50 to \$500 for a daily production of 40,000 to 100,000 board feet, depending on the mix of butt logs and upper logs being sawed.

Surface stabilization of wood achieved at less cost. Surface treatment with phenolic resin has marked benefits as a low-cost method of stabilizing wood against swelling and shrinkage. Dimensional changes are believed to cause premature failure of paints and other finishes. Experiments have shown that a simple dip treatment of about 5 minutes' duration is enough to introduce a sufficient amount of phenolic resin into the surface-zone fiber walls to provide appreciable stabilization.

Purpose of chemical stabilization of only the surfaces is to hold treating cost as low as possible. Previous research that led to such products as FPL impreg and compreg required wood thoroughly treated throughout its thickness. That treatment, while highly effective in stabilizing dimensions, is costly and adds considerable weight.

The recent findings hold promise for the development of a treating system that would greatly improve wood's stability at tolerable cost levels.



Paper sheet being formed on Forest Products Laboratory paper machine is impregnated with starch as it passes through dip between rolls of horizontal size press.



Harness of face of two story experimental house subjected to simulated wind loads.

Figure R-1

(24) Forest Engineering Research \$671,000

An increase of \$255,000 is needed for the following purposes:

- (a) \$252,000 to develop improved methods of harvesting and transporting Appalachian timber, with resulting reduction in unit costs.
- (b) \$3,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Forest Engineering Research involves developing engineered systems and techniques for forest resource production, protection, and utilization that will improve the efficiency of operations. It is concerned with better engineered performance and mechanization in the more complex aspects of multiple use practices. Multiple use requirements dictate that new and sometimes revolutionary systems be developed to facilitate protection and maximum utilization of forest resources under intensive management practices.

Vastly improved transport and harvesting methods are needed to assure protection of soil and water resources, to harmonize timber harvesting with other multiple use requirements such as recreation, and to avoid loss of timber-growing areas to road rights-of-way. Industrial research in engineering has been confined to specific equipment for scattered unrelated projects with relatively limited objectives in contrast to research on coordinated systems required by multiple use considerations and for maximum economy. The Forest Service's engineering program is designed to fill this latter need. The relative inaccessibility of many National Forest lands and their high values for recreation, watersheds, wildlife, and timber require strong engineering advances.

It is estimated that in Oregon and Washington alone there are at least 28 billion board feet of timber, characterized by low volumes per acre, steep terrain, and costly road access which will require special harvesting and removal techniques, such as by balloons or other aerial systems and machines specially developed to lessen the need for high cost roads. In Alaska, there are an estimated 61 billion board feet of timber which cannot be successfully logged with conventional systems, which are costly to the operators and damaging to the soil, water, and scenic values. Special logging systems and equipment for economical timber harvesting and cultural operations on small woodland ownerships are urgently needed. Specialized equipment and methods are needed to update antiquated naval stores harvesting operations. In Eastern hardwoods where some 74% of the total volume is considered low grade and culls, vastly cheaper harvesting methods must be developed if such low quality timber is to be removed economically and the sites replanted to better species. Sharply reduced regeneration costs are needed to accelerate the job of replanting 50 million acres of idle or poorly-stocked commercial forest land.

Examples of Recent Accomplishments

New tires permit logging road cost reductions. Results of a recently completed study on the effect on roads of the new wide single tread tires point the way to savings of between \$750 and \$1,000 per mile in construction of ballasted-type logging roads where full-scale use of the new tires can be planned. Since many thousands of miles of such roads are built annually (2,000 miles in one region alone) the potential savings can be significant.

Aerial logging systems. Substantial progress has been made in developing and facilitating aerial logging systems which reduce road requirements, protect soil and water values, improve the aesthetic appearance of the logged areas, and permit logging of difficult access areas. Design and operating criteria, heretofore lacking, are being developed to insure economical and safe balloon and skyline logging systems. Instrumented balloon logging trials are scheduled in the spring of 1966. Simplified design procedures have been developed to permit logging engineers to design and lay out more economical and safer skyline systems.

(25) Forest Survey \$2,055,000

An increase of \$116,000 is needed for the following purposes:

- (a) \$102,000 to intensify inventories of the timber resources of Appalachia, making current and more localized information available to support resource development.
- (b) \$14,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The Forest Survey provides a continuing inventory of the area, location, and condition of forest lands, amounts and quality of timber volumes available, rates of timber growth, timber cut and mortality, ownership of forest land and timber, and trends in timber consumption. The forest resources of the Nation, comprising some 758 million acres, vary greatly in productivity and availability for industrial use and show widely divergent trends in growth and depletion. Federal, State, and local forestry agencies need up-to-date knowledge of the changing trends in timber supplies to provide an evaluation of the effectiveness of and needs for forestry programs. Also, because of increasing pressures generated by the various uses of forest land, and rapidly changing resource and industrial conditions, forest industries rely more and more upon the Forest Survey for resource information essential to business decisions regarding land acquisition, wood procurement programs, and the feasibility and locations of new or expanded industrial plants.

Examples of Recent Accomplishments

Nationwide progress on forest surveys. During the past year field inventories of timber resources were conducted in all sections of the country including Alaska, California, Kansas, Kentucky, Louisiana, Michigan, North Carolina, Oregon, Pennsylvania, South Dakota, Texas, and Vermont. A new national appraisal of present and prospective timber supplies and demands - the latest in a series of periodic timber reviews for the Nation - was completed and published. Several reports on the forest situation and industrial outlook in States were released. A number of local appraisals of present and prospective timber supplies also were completed to provide resource data for rural area development programs.

"Timber Trends in the United States" - A new appraisal of United States timber supplies and demands has been completed. Results of this new appraisal indicate that prospective timber growth and inventories in the United States - assuming continuation of recent levels of forest management - will be sufficient to meet projected demands for the next two or three decades, but not in the later years of this century. (See Figure S-1.) Timber supply-demand relationships in the United States have generally improved significantly over the past decade or two as a result of fire control and other forestry programs. Growth of softwood sawtimber in 1962 was approximately equal to the cut, while growth of hardwood sawtimber was about 60% greater than cut. Declining quality of the timber resources represents a major problem for wood-using industries, and continuing declines in tree size and quality are to be expected if forest management efforts are only maintained at recent levels.

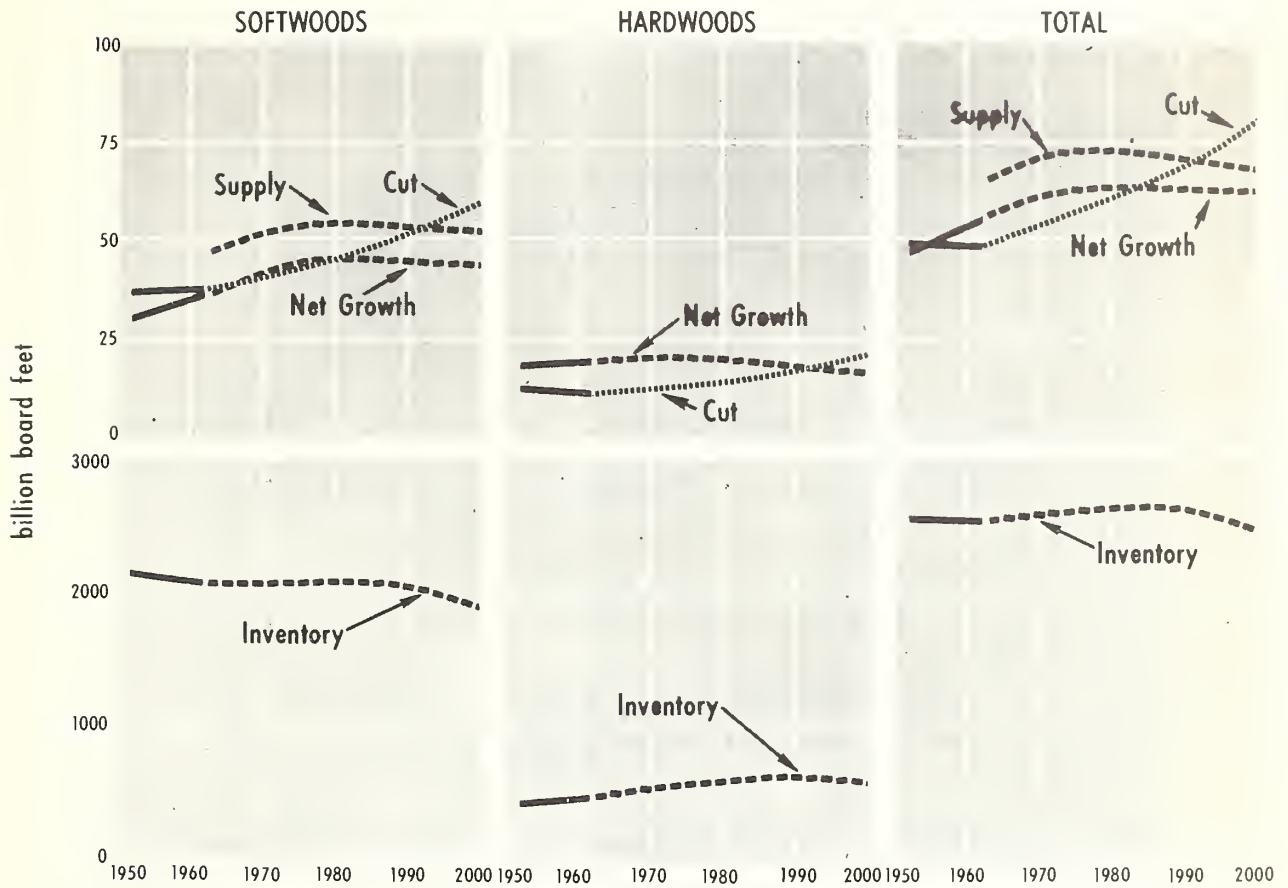
The timber supply outlook is relatively favorable for the pulp and paper industry, partly because of the impressive increase in use of species and materials formerly considered unusable, the more favorable outlook for total inventory of fiber, and major improvements in technology. For the lumber and plywood industries the outlook is not so encouraging. For these industries, the downward trends in timber quality and size point to rising costs of production and serious marketing problems, unless technological improvements can be accelerated. Imports of timber products are likely to increase somewhat, but most of the projected timber supply required to meet future United States demands is expected to come from forests of this Nation.

Domestic timber supplies could be increased sufficiently to meet projected timber demands in the year 2000 through more intensive forest management, such as timber stand improvement, increased planting and protection, and closer utilization of timber in the woods and in manufacturing plants. Farm and miscellaneous private forest land ownerships are of key importance in achieving such improvements in management of forest lands since these ownerships comprise about 60% of all commercial forest lands in the United States. (See Figure S-2.)

West Virginia's forest resources increasing. A recent resurvey of West Virginia showed many significant changes since the initial survey in 1946-49. The area of commercial forest land increased 15% in this period, largely as a result of abandonment of 1.5 million acres of farm land. Almost three-fourths of West Virginia's land area is now in forests. Annual growth of sawtimber has averaged somewhat more than double the cut of nearly one-half billion board feet. Growing stock volume has risen almost 5 billion cubic feet between inventories--almost an 80% increase. Saw logs for lumber is the leading timber product, with pulpwood amounting to about one-third as much as the lumber output.

Pulpwood production in the South continues to increase. Pulpwood production in the South reached 26.6 million cords in 1963, a 4% increase over 1962. The South produced 60% of the Nation's total pulpwood. Georgia was the leading pulpwood producing State in the South with 5.5 million cords, or over one and a half times as much as the next State, Alabama. Pine roundwood comprised only 64% of the total production in 1963, compared with 87% in 1953.

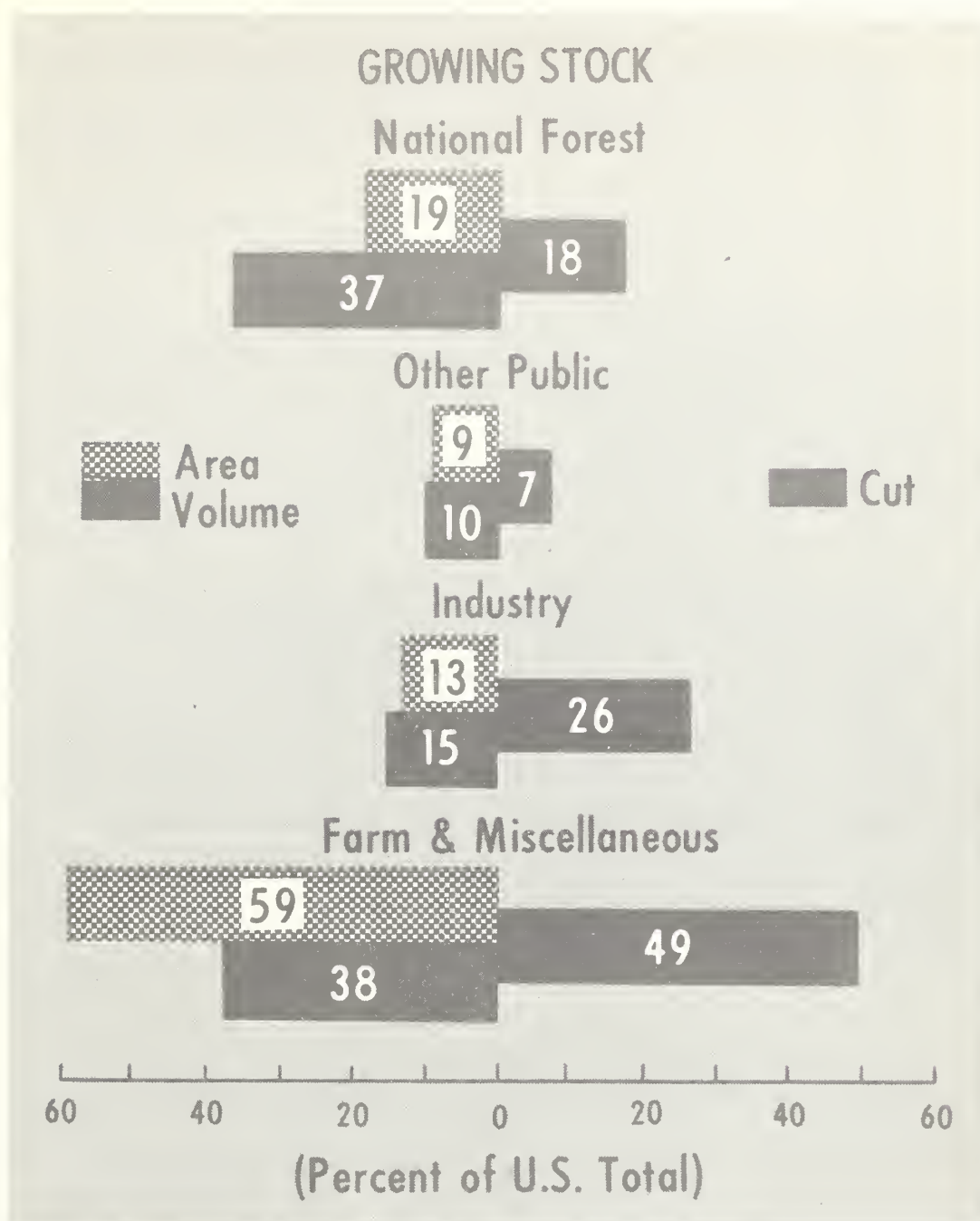
SAWTIMBER GROWTH, SUPPLY, CUT & INVENTORY IN THE U.S.



With continuation of recent levels of forest management, prospective timber growth and inventories will be sufficient to meet projected demands for next two or three decades, but not in 2000.

Figure S-1

AREA, VOLUME, AND CUT, BY OWNERSHIP



Farm and miscellaneous private forest land ownerships are of key importance in achieving improvements in management of forest lands. These ownerships comprise about 60 percent of all commercial forest lands in the U.S. and provide about half the timber harvested for wood-using industries.

Figure S-2

(26) Forest Products Marketing Research \$1,773,000

An increase of \$282,000 is needed for the following purposes:

- (a) \$272,000 for research to improve the efficiency of marketing timber, logs, lumber, dimension, pulpwood, and other forest products of Appalachia as an aid to more complete utilization of available resources.
- (b) \$10,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

The increasing availability of timber in the United States, coupled with growing needs for improved employment opportunities in many rural areas, emphasizes the need to expand wood markets and wood-using industries. Lagging consumption of some products such as lumber illustrates the need for a fuller understanding of current wood-use patterns and the factors that favor or limit demand for wood products in various markets. Strengthening the timber economy requires improvement of marketing systems and market outlets for major classes of wood products.

Forest Products Marketing Research includes studies to evaluate trends in use of wood products and competing materials in construction, manufacturing, and shipping; and to determine factors that influence these trends. In the construction field, for example, research seeks ways to strengthen markets for laminated products, millwork, and components for light-frame structures. Such studies provide direct guides for production and marketing adjustments in forest industries, as well as a needed basis for periodic appraisals of the Nation's timber situation and outlook. Other research evaluates opportunities to increase efficiency in harvesting, processing, distribution, and use of important timber products to reduce costs and promote greater consumption of wood materials. Also included is research to improve appraisal and sale of public timber. This includes studies of better methods of determining conversion costs, product values, and net returns.

Strengthened markets for wood products will increase returns to millions of forest landowners and employees and operators of wood-using plants, and enlarge the contribution of timber to the economy of the Nation and to many local areas where timber is a principal source of employment and income. Improved marketing systems will also improve services to consumers of wood products.

Examples of Recent Accomplishments

Current and future demand for timber products analyzed. A comprehensive analysis of trends in national consumption of timber products in construction, manufacturing, shipping and other end uses, published in a new report on "Timber Trends in the United States," indicates that demand for timber products by the year 2000 may exceed current use by 80%. Since 1920, total use of "industrial" wood in the United States (all wood except fuel wood) increased by about one-third, reaching 10.7 billion cubic feet in 1962. Projected demand, developed

Project (26)

in this study, rises to 20.8 billion cubic feet by 2000. Lumber use is projected to increase from 37.3 billion board feet in 1962 to 53.5 billion board feet in 2000, with nearly 90% of the increased use in construction. Plywood consumption is expected to increase two and a half times, with about 70% of the increase in construction. Demand for pulpwood is projected to increase nearly three-fold by the end of the century.

Wood products are expected to make up about 21% of all industrial raw materials used in the year 2000--roughly in line with recent trends. To maintain this sizable portion of the total market for raw materials will require continued improvement in productivity of wood-based industries and effective marketing of wood products.

Timber industry opportunities in selected areas of West Virginia and Minnesota evaluated. The amount, quality and cost of timber, labor, water, transportation, and other resources and facilities in selected areas were evaluated in terms of their effect on opportunities for industrial development and expansion of local employment. Data from these studies provide both public and private agencies with needed information on potential development of timber resources in these areas. Of five areas studied in West Virginia, for example, three have resources favorable to expansion of lumber production, two have advantages for particle board production, two are better suited than the others for furniture production, and one is superior for a woodpulp industry. The analysis also shows that prospects for manufacture of lumber, woodpulp, and furniture parts are better than those for manufacture of particle board and finished furniture. In Minnesota, transportation cost advantages, water resources, and other factors favor development of fiberboard production at several locations, but there are fewer satisfactory locations for pulp mills requiring large volumes of water. More than 6,000 persons in the study area were actively seeking employment. Most possessed technical skills, were in the younger age classes, and were relatively well educated.

Wood is a good buy for highway guardrail posts. There is an overabundance of wood material in the Appalachian area suitable for production of treated wood guardrail posts, yet few of the 30 thousand posts used annually along West Virginia highways are made of wood. A recent study in that State showed that, contrary to common belief, installed costs of treated wood posts are 15 to 20% lower than costs of widely used steel and other non-wood posts.

A new company formed on the basis of these findings is now installing wood guardrail posts in West Virginia.

A major drawback to the use of wood is the slow rate of post installation which creates problems for contractors who must install guardrails during a limited period in the late fall. Research is under way to test a commercial machine which preliminary tests indicate can drive wood posts at a satisfactory rate.

Residential fences--a market for wood. Studies in metropolitan St. Louis and three selected villages in southern Illinois showed that three out of four homes in these areas have some type of fence on the property. For homes with fences, the amount used averaged about 90 lineal feet but differed significantly with age of house. In St. Louis, for example, houses less than five years old averaged 33 lineal feet of fence; those five to ten years old averaged 99 feet, and houses ten years old or older averaged 106 feet.

House value had no significant effect on the total amount of fence used, but the amount of wood fence increased and the amount of wire fence declined as house value increased. Similarly, corner and interior lots had about the same amount of fence, but the lineal feet of wood fence on corner lots was about three times the amount found on interior lots.

Continuing studies are being made to find ways to expand markets for wood residential fencing.

Hardwood floors outshine competitive materials in maintenance study. An important consideration in the selection of flooring materials by architects, builders, and homemakers is the ease and cost of floor maintenance and its effect on the long-run cost of the floor. Claims of easier and cheaper maintenance play a leading role in the promotion of resilient flooring and carpets even though there is little evidence to support claims that one type of flooring is superior in this respect to another.

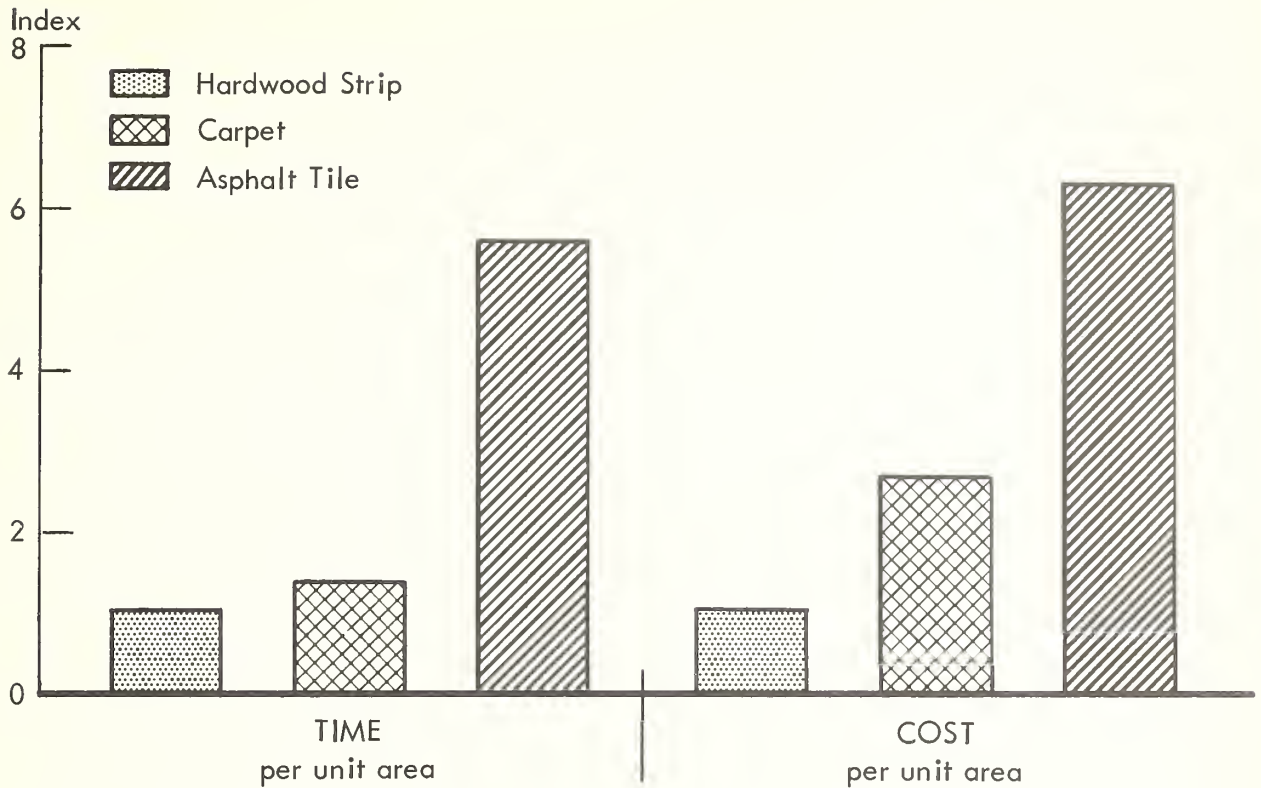
Preliminary results of a study now underway indicate that hardwood floors last two to four times longer and require much less time and expense to maintain than other flooring materials commonly used in residences. In Boston, for example, time spent per square foot maintaining exposed hardwood floors in living rooms averaged 28 to 82% less than the time spent on the various non-wood floors or floor coverings studied. (See Figure S-3, top.) Furthermore, the average unit cost of maintaining wood living room floors, including all materials and professional care, was less than half the cost of maintaining wood's nearest competitor.

Wood use in new single-family homes increasing--but mix of wood materials changing. Studies of FHA-inspected houses showed that between 1959 and 1962 the amounts of lumber, plywood, wood-based building boards, and wood shingles and shakes used per new house all increased significantly, but the rate of increase differed widely among these wood products. (See Figure S-3, bottom.) Building boards and plywood largely replaced lumber for sheathing and subflooring, and non-wood materials penetrated further into traditional lumber siding and flooring markets. Nevertheless, lumber use per new FHA-inspected house built on-site increased 130 board feet during the

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3-year period to a total of 10,200 board feet--due primarily to an increase in house size. Plywood use per unit increased 30% to a total of 2,234 square feet (3/8-inch basis). Increases in use of other wood products ranged from 25% for insulation board to 40% for particle board. However, though house size increased 7% during the 3-year period, total wood use increased only 3% and varied widely by house type and geographic region.

DIFFERENCES IN MAINTENANCE REQUIREMENTS FAVOR WOOD FLOORS



WOOD USE IN NEW SINGLE-FAMILY HOUSES INCREASED 1959-1962 . . . BUT MIX OF WOOD MATERIALS CHANGED

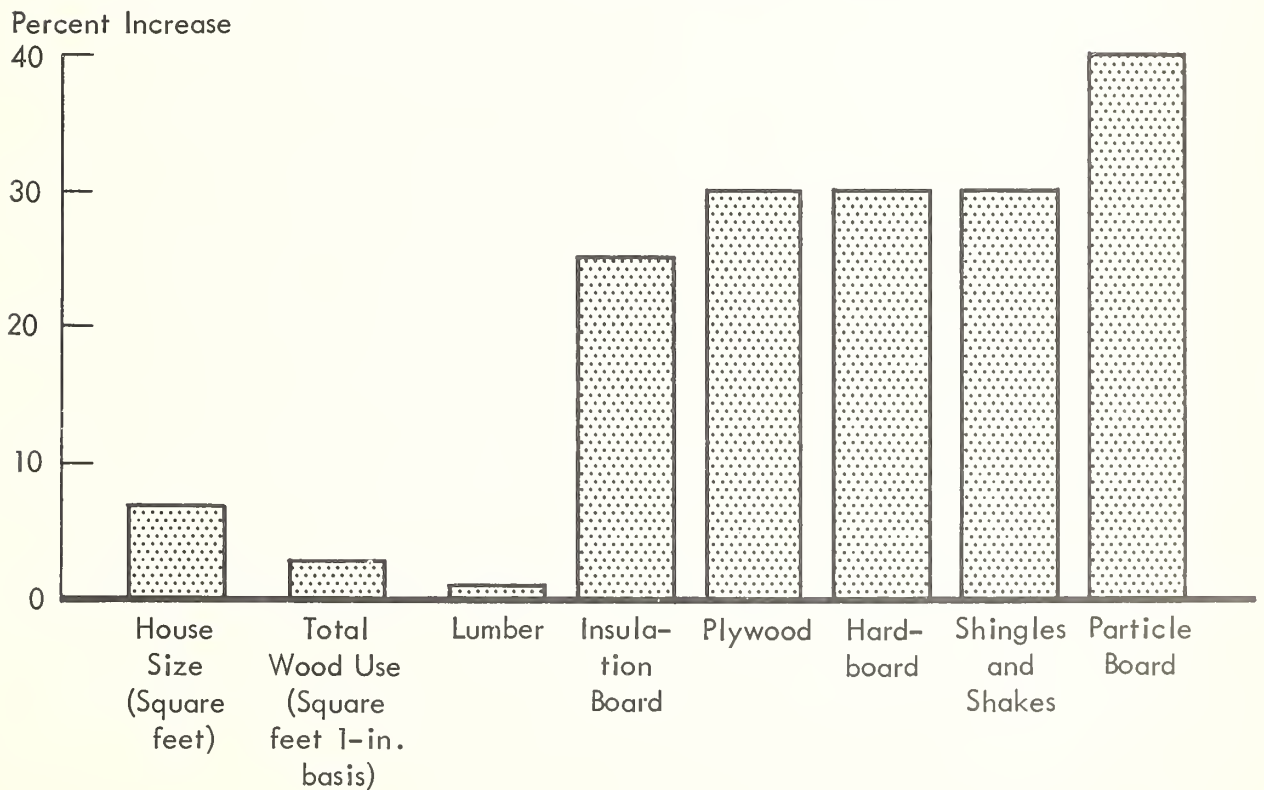


Figure S-3

(27) Forest Economics Research \$663,000

An increase of \$5,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

This program of research applies to both National Forests and other public lands and to the major part of the Nation's forest lands that are owned by some 4.5 million farmers and other private, nonindustrial landowners.

Demands on the Nation's forest lands for production of timber, outdoor recreation, and other goods and services are intensifying steadily. Problems of achieving allocation of capital for resource development are becoming correspondingly more complex. Timber growing opportunities vary widely throughout the United States by site, type, ownership, market condition, and land use alternatives. Owners differ greatly in their response to forest investment opportunities and to assistance programs of forestry agencies. Such complexity combined with increasing resources demands has increased the need for economic evaluations to aid in the prudent allocation of funds and effort to forest protection and management, timber harvesting and land use alternatives.

The research includes studies in the important timber regions to evaluate costs and benefits realizable from expenditures for tree planting and seeding, timber stand improvement, thinnings, salvage, prelogging, fire and pest control, advance access road development on National Forest and other lands, and other technical forestry practices. Special emphasis is given to improving supplies of quality hardwoods that are in increasingly short supply and to the development of Western softwood timber supplies.

Related studies seek to determine how public assistance programs directed to the 4.5 million private nonindustrial owners of forest land can be made more effective in increasing owner incomes and resource productivity on the vast area of their forest holdings. Other studies are directed to developing principles and guides for alternative multiple use management plans. These include the development of computer-oriented planning systems to increase the efficiency of land management for timber, recreation, wildlife, water, or other goods and services on public, farm, and other private ownerships.

Examples of Recent Accomplishments

Plywood industry growth displaces lumber capacity in Douglas-fir region. An increase of 2.3 billion board feet, log scale, in plywood capacity in the Douglas-fir region between 1951 and 1960 was accompanied by a decrease of 2 billion board feet in lumber industry capacity. Total log production during this period remained relatively stable at 10.9 billion board feet. Log consumption for pulp also remained fairly constant. Thus, plywood industry expansion came largely at the expense of lumber industry log supplies.

Forest industry capacity in the Douglas-fir region in 1960 still exceeded prospective log harvests for the 1960's by nearly a billion board feet. The unused capacity was heavily concentrated in the lumber industry in western Oregon. Further reductions in lumber capacity were projected in response to the excess of forest industry capacity over prospective log supplies and to further, but slower, expansions in plywood capacity.

Michigan's public timber harvest expanding--private cut declining.

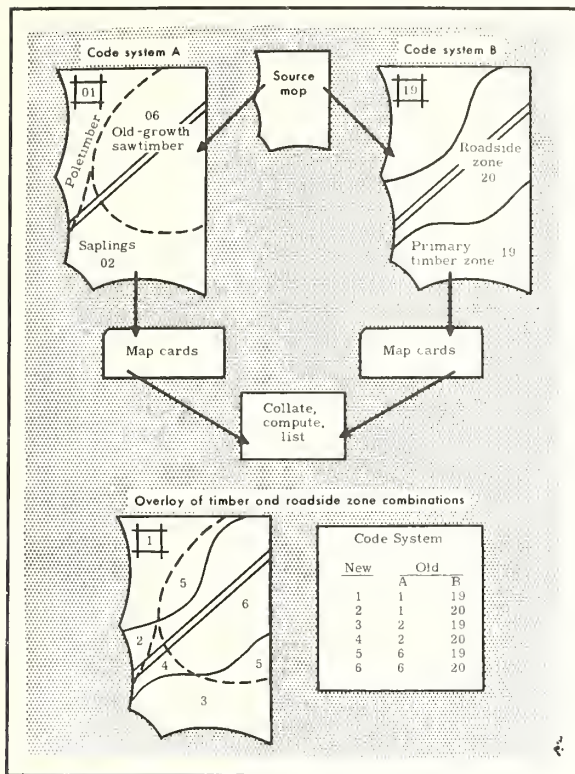
The harvest of timber products from Michigan's State and National Forests quadrupled between 1950 and 1960. In the same period the harvest from private lands declined 32%. The steep upward trend in timber harvests from public lands is attributed mainly to more aggressive marketing methods, larger scale of timber operations and better forest management, including improved timber inventories and growth rates. The declining trend in the private ownership share of the annual timber harvest in Michigan is attributed to expanding urbanization, private forest land fragmentation, absentee ownerships, owner disinterest in timber sales, and generally less intensive forest management than that on public lands.

Computer system for organizing land management planning information.

A computer system has been developed to systematically assemble complex multiple use management information and inexpensively up-date and compile resource data into new maps and tables. The system was developed in response to the growing cost and inefficiency of traditional methods for up-dating and using conventional maps for land management planning purposes.

The system transforms conventional map data into numbers which are punched into cards. A computer then assembles and displays information required for each land management planning task. The computer program can select data from several map sources, combine it with non-map data such as land treatment costs, yields and benefits per acre, and prepare new overlays and tabulations required to facilitate development of land management plans and operations. The present program is limited to 98 classifications but capable of expansion. (See Figure S-4.)

Computer systems are being developed to increase efficiency and reduce costs of multiple use land management planning on public lands and to evaluate costs and returns of alternative management programs.



The picture at left provides a diagrammatic presentation of a computer system for combining land management data from different resource maps and printing out a new map overlay showing resource combinations for multiple use management planning purposes.

The picture at right shows a diagrammatic presentation of a computer system to locate and map out planting opportunities and estimate costs for alternative planting areas and the total planting potential.

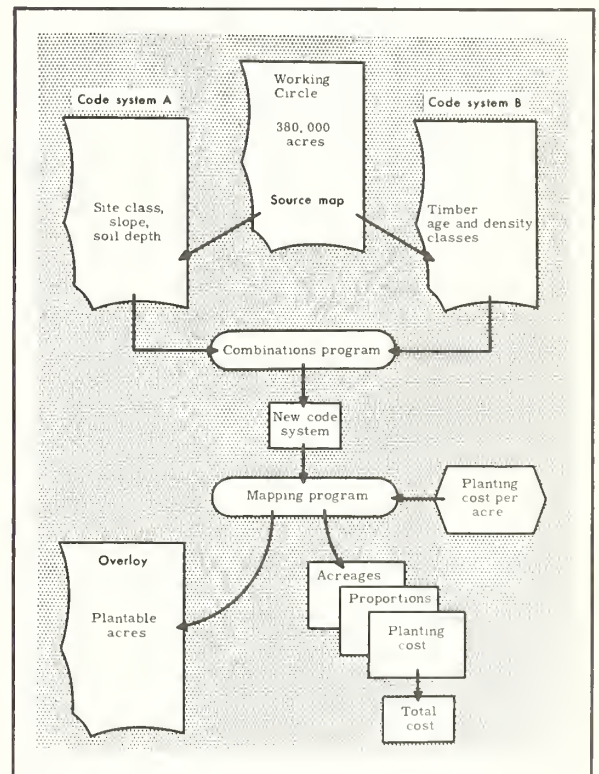


Figure S-4

(28) Forest Research Construction \$0

A decrease of \$4,183,000 is proposed for fiscal year 1967.

The 1966 appropriation provided for the following non-recurring items:

Construction:

Morgantown, West Virginia	\$468,000
New Haven, Connecticut	850,000
Fort Collins, Colorado	1,280,000
Missoula, Montana	425,000
Houghton, Michigan	390,000
Ames, Iowa	200,000
Olustee, Florida	250,000
Sewanee, Tennessee	190,000

Design and specifications:

Athens, Georgia	75,000
Olympia, Washington	35,000
State College, Mississippi	<u>20,000</u>
Total	4,183,000

Examples of Recent Accomplishments

Construction is under way on the addition to the Forest Products Laboratory at Madison, Wisconsin funded in fiscal year 1965. Facilities funded in fiscal year 1965 for chemical pesticide screening at Berkeley, California are completed.

Contracts have been let for construction of seven laboratories and one greenhouse-headhouse for which appropriations were made in fiscal year 1966.

Laboratory planning included in the fiscal year 1965 appropriation is on schedule, and plans for the four laboratories will be completed so that construction can begin as soon as funds are provided.

Laboratory planning for the three locations included in the fiscal year 1966 appropriation is on schedule. Detailed design and cost estimates will be available for laboratories at Olympia, Washington, and State College, Mississippi, by March 1, 1966. Planning for the Athens, Georgia, laboratory was funded later in the year and architectural work is in the initial stages with completion estimated for the first of calendar year 1967.

Research on the complex problems associated with present day multiple use forest and range management requires the skill of highly trained scientists. To capitalize on their advanced training, these scientists must work in an efficient environment combining good basic facilities with modern equipment. (See Figure T-1.) Recent improvement in forestry research facilities through construction is summarized in the following tabulation:

Current Status of the Construction Projected
In "A National Forestry Research Program"
Fiscal Years 1963-72 (August 1965)^{1/}

Locations where facilities are adequate; no construction required	13
Locations where facilities have been added by recent construction; no further construction required	17
Locations where laboratory needs have been partially met by recent first stage of construction planned; further construction required	24
Locations where facilities are inadequate; no construction provided to date; construction required	<u>26</u>
Total	80

^{1/} Includes construction funded in the fiscal year 1966 appropriation.



The recently completed Forestry Sciences Laboratory at Logan, Utah, provides modern facilities for conducting Watershed and Range Management Research for high mountain areas. The research at this location also includes studies of diseases and insects affecting browse plants.

Figure T-1

(29) Cooperation in Forest Fire Control..... \$12,811,000

An increase of \$8,000 is needed for the increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

These funds are needed to reduce fire losses and prevent conflagration fires.

Protection from fire is a basic necessity for the development and use of all forest resources - water, timber, special forest products, wildlife forage, recreation, and natural beauty. Dependent upon these resources are individual land-owner and operator incomes, community development, and better living for both rural and urban consumers residents, and visitors.

A recent survey by the Forest Service indicates an increased national need for timber of good quality before the year 2000. Increasing population and greater use of all forest resources are dependent upon better protection from fire. The Department of Agriculture therefore is preparing a program for State and private forest lands in which fire protection will be a major part. This program involving the team action of 8 agencies in the Department sets up goals for the period 1967 to 1976 for forest protection development, and use.

The goal over a 10-year period is to intensify fire protection on commercial forest land to the point where the average annual burn will be reduced to 1 million acres. Other wildlands will also receive intensified protection so that losses on these lands will be reduced to tolerable limits. Ten years hence the total protected area is expected to rise to 600 million acres.

Current and past fire protection efforts by the State Foresters have not brought about a reduction in the number of man-caused fires despite the work of the Advortizing Council's Smokey Bear Campaign and others. In the West especially, the number of fires and area burned continue to increase. Incendiarism, particularly in the South, is not yet under control. Fire prevention and suppression strength is not now sufficient to utilize fully the new but more expensive technical innovations and techniques that show promise of being especially effective.

Emphasis on these needs will become possible and specific action is planned in the 10-year program for State and private forest lands. It will include:

1. Emphasis on fire prevention and the employment of additional technical specialists to cope more adequately with this "people" problem.
2. Expansion of the use of aircraft and helicopters for fire detection and suppression.
3. Full utilization of fire danger measurements as a basis for determining needed strength of force to prevent large disastrous fires and to control potentially catastrophic fires quickly when they do occur and needed funds for augmenting these forces during critical periods. (See Figure U-1.)

4. Assisting the Western States to fulfill their responsibility for adequately protecting an estimated 50 million acres of State and private land intermingled with or adjacent to public domain lands. These State and private lands are now protected by the Bureau of Land Management with funds appropriated for protection of the public lands. That agency can no longer do this and the States must assume the protection job.
5. Special attention to fire protection needs in Alaska. That State will eventually obtain title to more than 100 million acres of public domain and other Federal lands. Fire protection has in the past been provided through appropriation to the responsible agency, primarily the Bureau of Land Management. In fiscal year 1964 State expenditures for fire protection were \$229,540 to protect the 9,250,000 acres already placed under State administration. The State faces the need to plan for and to create administrative and protective forces to assume fully the fire protection job and to handle the increased fire hazards and risks that will accompany population growth and resource development and use.

Examples of Recent Accomplishments

1964 was a less disastrous fire year than 1963. The burned area was reduced to 4 million acres. The 1963 total was 7 million acres. This accomplishment was primarily due to an easier fire weather year. However, weather conditions were critical in parts of the Nation in 1964 and effective suppression action prevented several serious disaster fires.

A reanalysis of the fire protection situation which was completed during the year established new and higher goals for protection of State and privately owned lands from fire. As a result of this review and the extension of protection to previously unprotected areas, the State Foresters reported that there are now 446 million acres protected under the Clarke-McNary Program.

The Neighborhood Youth Corps Program furnished supplemental help to State fire protection efforts. Conservation work crews built fire roads and trails, constructed fire lines, did hazard reduction work, and suppressed fires.

Several State forestry organizations made significant progress in developing cooperative arrangements with rural fire departments to take coordinated fire suppression action on wildland fires. This was a highlight in Nebraska and Kansas. In Nebraska it was a major factor in the control of a disaster fire in the sandhills area.

The allotment and expenditure table which follows shows State fiscal year 1965 expenditures and Federal fiscal years 1965 and 1966 allotments to the States. The Federal distribution to each State is based on a formula which recognized the program need and expenditure level in each State.

COOPERATIVE FOREST FIRE CONTROL

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Project (29)

	State and Private Funds Expended F. Y. 1965	Federal Allotments F. Y. 1965	Federal Allotments F. Y. 1966	1/
Alabama.....	\$1,041,578	\$ 397,500	\$ 383,890	
Alaska.....	192,150	53,500	47,000	
Arkansas.....	1,249,234	383,300	391,080	
California.....	21,275,462	1,112,000	1,073,080	
Colorado.....	115,754	48,200	47,000	
Connecticut.....	400,306	85,300	88,120	
Delaware.....	14,794	13,500	15,500	
Florida.....	4,304,235	573,100	560,530	
Georgia.....	3,114,974	575,400	558,940	
Hawaii.....	36,564	35,000	35,000	
Idaho.....	508,468	206,100	210,630	
Illinois.....	196,435	68,100	73,390	
Indiana.....	166,733	52,000	55,950	
Iowa.....	64,000	47,000	47,000	
Kansas.....	114,700	47,000	47,000	
Kentucky.....	881,185	246,400	243,090	
Louisiana.....	2,016,992	477,100	460,400	
Maine.....	1,089,141	330,300	318,740	
Maryland.....	577,327	149,800	145,130	
Massachusetts.....	665,888	133,500	148,310	
Michigan.....	1,995,237	483,500	490,460	
Minnesota.....	597,170	302,900	300,210	
Mississippi.....	1,650,316	477,200	466,330	
Missouri.....	1,011,803	279,300	315,860	
Montana.....	406,430	154,150	150,640	
Nebraska.....	89,980	47,000	47,000	
Nevada.....	368,377	67,400	76,130	
New Hampshire.....	262,292	93,000	89,740	
New Jersey.....	620,150	133,200	143,980	
New Mexico.....	172,276	47,000	47,000	
New York.....	1,715,203	289,700	298,880	
North Carolina.....	1,728,032	451,900	452,650	
North Dakota.....	114,031	13,000	43,250	
Ohio.....	427,323	125,100	127,870	
Oklahoma.....	169,687	168,800	162,900	
Oregon.....	2,591,477	545,700	525,150	
Pennsylvania.....	1,195,161	273,200	305,700	
Rhode Island.....	135,806	47,000	47,000	
South Carolina.....	1,575,748	408,000	420,680	
South Dakota.....	73,226	47,000	47,000	
Tennessee.....	1,267,949	375,300	373,250	
Texas.....	851,998	338,100	334,170	
Utah.....	144,621	47,500	49,740	
Vermont.....	81,345	47,000	47,000	

COOPERATIVE FOREST FIRE CONTROL

Project (29)

C-M 2

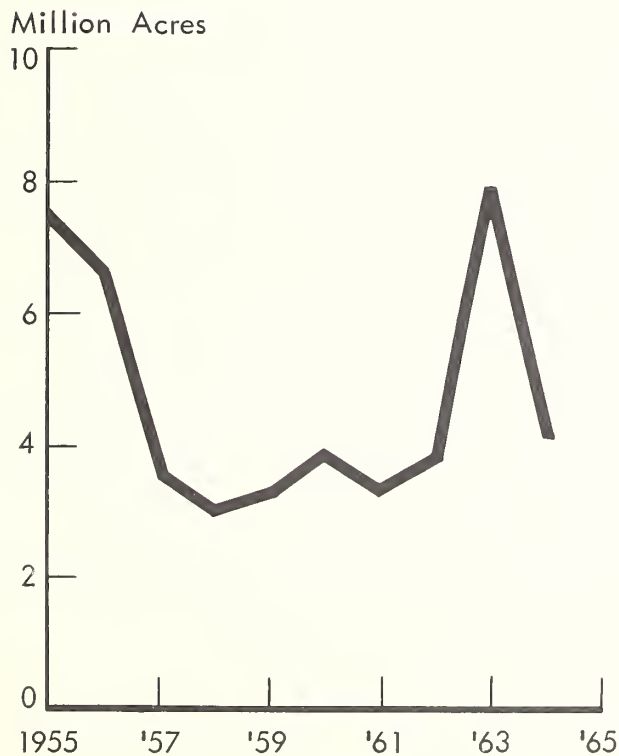
	State and Private Funds Expended F. Y. 1965	Federal Allotments F. Y. 1965	Federal Allotments <u>1/</u> F. Y. 1966
Virginia.....	\$1,379,474	\$ 363,600	\$ 368,920
Washington.....	2,838,308	555,000	539,840
West Virginia.....	423,815	167,200	161,350
Wisconsin.....	1,774,303	423,800	412,520
Wyoming.....	72,747	48,000	47,000
Administration, Inspection, Prevention & Special Ser- vices To States.....		904,350	961,000
GRAND TOTALS.....	<u>63,657,205</u>	<u>12,758,000</u>	<u>12,803,000</u>

1/ While the amount available to a State may, if the allotment is small, exceed previously computed expenditures by that State, the actual payment to a State never exceeds State and private funds expended by or under the control of the State.



Large fires (5% of the total number) cause 90% of the losses.

AREA BURNED
STATE AND PRIVATE LANDS
1955 - 1964



MAN CAUSED FIRES
STATE AND PRIVATE LANDS
1955 - 1964

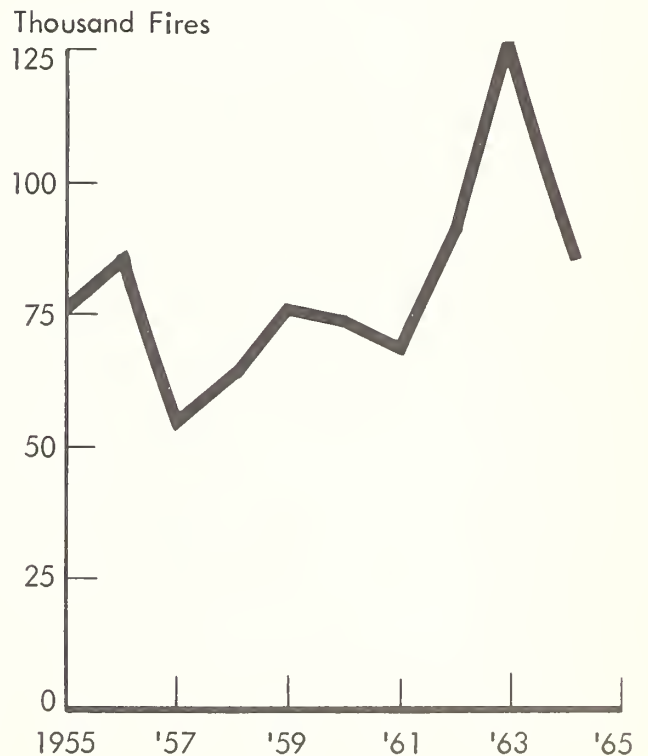


Figure U - 1

(30) Cooperation in Forest Tree Planting (C-M 4)..... \$300,000

No program increase is proposed for fiscal year 1967.

The Forest Service cooperates with the States through financial assistance and technical and other services in the production, acquisition, and distribution of tree planting stock and seed for forest and windbarrier plantings and seedlings. This program is authorized under Section 4 of the Clarke-McNary Act of 1924.

The Conservation Needs Inventory of 1958 indicates a need for 70 million acres of tree planting on private, State, and municipal land. The current rate of reforestation is around 1 million acres annually. At the current forestation rate, it will take about 70 years to accomplish this forestation. The rate of reforestation needs to be at least doubled or possibly tripled to put this 70 million acres in productive condition to meet the need for a wide variety of uses including timber production, wildlife, watershed, recreation, and special forest products. Federal leadership and financial participation is necessary to restore these unproductive lands to productivity and meet the Nation's timber resource needs and strengthen the basis for stronger local economic stability. Tree planting stock will be needed also to plant land converted from cropland use under the Food and Agricultural Act of 1962 and the Resource Conservation Development and Rural Renewal Areas Programs. The War on Poverty will need trees for planting in impoverished rural counties to provide employment and develop the woodlands in these areas. The 1967 objective is to assist the States in production of high quality seedlings for distribution to private landowners for reforestation and shelterbelt planting. This planting stock will, in many ways, aid in the President's Beautification Program. This program complements private forestation programs that depend upon planting stock for reforestation and shelterbelt plantings.

Examples of Recent Accomplishments

The 1965 Feder-State cooperation in the production and distribution of forest and shelterbelt planting stock, for use on non-Federal land, continues at about the 1964 level. Forty-eight States and Puerto Rico continued to cooperate in this program. They operate 98 nurseries that produced 535 million trees for forestation and shelterbelt planting under this program. (See Figure U-2.)

Some specific examples of accomplishment are as follows:

1. Special technical and financial help was provided 3 States in designing and constructing modern forest tree seed extractories and storage facilities. These new plants provide seed facilities that are necessary for efficient nursery operations.

2. The usual technical and financial assistance was continued. Emphasis was on helping with such technical problems as seeding, soil management, chemical weed control, insect and disease control, grading and packaging the planting stock, handling stock while enroute to the planting site. Improvement in nursery techniques along with better field planting practices are resulting in better survival, more rapid growth, and reduced costs for establishing a stand of forest trees and shelterbelts.
3. Some States are successfully assisting landowners with direct seeding where research has developed such practical reforestation methods.
4. A special training course in forest tree nursery soil management was held at Syracuse University January 1965. State and Federal nurserymen from the Eastern States participated in this important undertaking.
5. The number of trees shipped to landowners during each of the past 5 fiscal years in comparison with all forest and shelterbelt trees produced by public and private nurseries is as follows:

<u>Year</u>	<u>Federal-State Cooperative Program (M trees)</u>	<u>Other State Distribution (M trees)</u>	<u>Other Public and Private Distribution (M trees)</u>	<u>Total Output All Nurseries (M trees)</u>
1961	744,159	256,944	536,455	1,537,558
1962	679,968	42,776	402,587	1,125,331
1963	587,647	30,607	390,135	1,008,389
1964	535,429	48,763	364,120	948,312
1965	508,651	37,805	338,220	884,676



Chemical spraying for weed control in a State Forest tree nursery.



A forest geneticist controlling pollination on a grafted slash pine tree in a seed orchard planted for the production of improved forest tree seed.

(31) Cooperation in Forest Management and Processing.....\$3,538,000

An increase of \$3,000 is needed for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

This program operates under authority of the Cooperative Forest Management Act of 1950, as amended. The Act authorizes the Secretary of Agriculture to cooperate with the State Foresters for the purpose of providing technical services to private forest landowners and operators and processors of primary forest products. Forty-nine States and Puerto Rico participate in this program on a 50-50 matching basis. Services are provided by State employees. The major objective of the program is to increase the money and other income opportunities of the Nation's 4.5 million private woodland owners. These income opportunities include annual or recurring cash income; capital gains from increases in value of the forest land as the stands are improved, the timber grows, and multiple uses expand; and the pleasures and satisfactions derived by the forest landowner and the community from the beautification of the countryside, and expanded recreation and other multiple uses. This is accomplished by assisting them to improve management and utilization of their forest resources for timber, water, forage, recreation, fish, game, special products, and aesthetic purposes. (See Figure U-3.)

On-the-ground assistance to landowners provided through the State forestry agencies includes such activities as making forest resource inventories; planning for multiple use management and beautification of the countryside; tree planting and seeding; improving timber stands; protecting forests from fire, pests and animals; and harvesting and marketing forest products.

Small private ownerships account for more than half of the Nation's commercial forest land and produce about half of its forest products. The owners of these lands and many local communities must look to them for income and employment. Timber-based industries must look to them for present and future supplies of raw materials.

Assistance also is provided loggers and operators of small plants processing primary forest products. This assistance is in connection with harvesting equipment and methods, marketing, and plant layout and operation.

Many of the primary processors of the products of the forest land in small ownerships have small locally owned and controlled establishments. These plants are extremely important to the local economy and the forest landowner in providing a ready market for the products of the forest. It is important that these plants produce a good salable product and do so at a profit.

Other uses also have assumed major importance. These forest lands have an important and rapidly increasing role in providing a base for development of outdoor recreation and improving natural beauty. Outdoor recreation enterprises offer woodland owners opportunities for profit from their forest lands, in addition to their growing timber and producing other forest crops. Private forests are important to the domestic and industrial water supply. This importance too is rapidly increasing. Fish and game, forage and special products now have an important place in small forest management.

The program is coordinated with other programs and agencies aiming to improve economic and aesthetic opportunities on private forest lands. Among these are the American Forest Products Industries' Tree Farm Program, Cooperative Extension Services, Agricultural Conservation Program, Soil Conservation Districts, Rural Community Development Service, Resource Conservation and Development Projects, and Public Law 566 Small Watersheds Program.

Intensive and complex management and operations now needed requires knowledge and skills not ordinarily possessed by owners of small forests and the operators of small forest product processing plants. The advice and assistance of professionally trained experts are needed. The program makes available such assistance through State-employed professional foresters trained in forest management and wood processing who work with individual landowners and primary processors.

Examples of Recent Accomplishments

The following tabulation shows the accomplishments in cooperative forest management and processing for fiscal year 1965:

<u>Activity</u>	<u>Unit</u>	<u>Accomplishment</u>
Owners given woodland management assistance.....	Number	99,100
Forest products operators assisted.....	Number	9,200
Area receiving management assistance.....	Acres	6,165,000
Timber products sold or harvested.....	MBF <u>a/</u>	716,950
Value of timber products sold or harvested.....	Dollars	17,442,000
Owners referred to consulting foresters and industrial foresters for additional assistance.....	Number	2,500

a/ Thousand board feet

Forty-nine States and Puerto Rico participate in this program. In fiscal year 1965, the States contributed \$4,109,100 and the Federal Government provided an estimated \$2,748,000. During this period only about 2.2% of the Nation's woodland owners were assisted by the 725 available "service" or farm foresters.



Multiple-use management offers opportunities for increasing forest land values for recreation, for profit, watershed protection, timber yields, fishing, hunting and other uses.



Figure U - 3

(32) General Forestry Assistance.....\$1,243,000

An increase of \$328,000 is needed for the following purposes:

- (a) Appalachian program - \$322,000. This item would make it possible to continue at the 1966 level a stepped-up program of general forestry assistance tailored to the needs of the area defined in the Appalachian Regional Development Act of 1965, without reducing the basic technical forestry assistance programs in this region. Appalachian program funds would be used to employ 25 to 30 State Service Foresters to give technical assistance to forest landowners in Appalachia to improve the growth and quality of their timber and to develop and utilize their land to best advantages for other compatible uses including its aesthetic values for the enjoyment of the owners and others. There are about 1 million woodland owners who own approximately 67 million acres growing Appalachian hardwood species. These funds will also be used to provide technical assistance in the field of forest product utilization and marketing for landowners, loggers, operators of small sawmills, other plants processing forest products, forestry-based cooperatives and associations, and other whose livelihood depends upon multiple use management of these woodlands. This assistance will directly and indirectly benefit the forest product industries, other related businesses and individuals throughout the Appalachian area and the Nation, especially those who manufacture and use products from Appalachian hardwoods. Most of these Appalachian woodlands owners have poorly stocked stands that are in immediate need of technical forestry assistance. Also assistance in utilization and marketing will help landowners and the associated 4,000 industries dependent upon this basic renewable forest resource to increase employment, raise social standards, establish a continuing prosperous forest economy, and help utilize to a fuller capacity the multiple use resources, timber, water, wildlife, recreation, aesthetic landscape and special products of the Appalachian area. The Forest Service will use these funds to provide program guidance, training, and special technical advice; and to reimburse the cooperating States for a part or all of the agreed upon costs of carrying out a stepped-up program of technical forestry assistance for the Appalachian Region.

The total appropriation of \$1,243,000 for fiscal year 1967 will make it possible to give technical assistance in management and utilization to over 6,000 landowners, loggers and processors of forest products, to serve about 600 State and local Rural Areas Development groups, and to help bring about improved forest management on more than 51 million acres of private, State, local and public, and non-Forest Service Federal forest lands.

- (b) \$6,000 for increased pay costs provided in the Federal Employees Salary Act of 1965 (79 Stat. 1111).

Objective of regular program. The Forest Service through its General Forestry Assistance Program provides technical services to expand markets for forest products in support of Rural Areas Development and to improve forest management, harvesting, processing, and utilization practices. The results of these services help improve economic conditions and employment in economically distressed rural areas.

General Forestry Assistance personnel provide specialized professional forestry assistance to States, counties, other Federal agencies, forestry associations and organizations, economic development groups, and to private owners of forest properties and forestry-based industries who do not otherwise have technical personnel available to interpret and apply research findings. (See Figure U-4.) The Forest Service performs forest management work in the Virgin Islands and cooperates with defense agencies to provide emergency supplies of timber and other forest products.

General Forestry Assistance funds are used to finance much of the cost of Forest Service State and Private Forestry activities in Departmental and other National Programs such as the following:

1. Rural Areas Development
2. Food and Agriculture Act of 1962 (Rural Renewal, RC&D)
3. Manpower Development and Training Act of 1962
4. Vocational Education Act of 1963
5. Economic Opportunity Act of 1964
6. Appalachian Regional Development Act of 1965
7. Land and Water Conservation Act of 1964
8. Proposed Northern Great Lakes and other Regional Programs
9. Public Works and Economic Development Act

Objective of Appalachian program. The Forest Service through cooperative agreements with State Foresters is providing increased forest management services to landowners and increased technical services to primary processors of forest products and Rural Area Development groups.

Examples of Recent Accomplishments

In fiscal year 1965 General Forestry Assistance work in all States was increased to assist Rural Areas Development groups in evaluating their forest resource capabilities and in planning and carrying out programs to develop and use these resources for improving rural employment opportunities and income. A majority of the low-income counties designated in accordance with the Area Redevelopment Act are more than 50% forested.

At the same time highly specialized technical assistance in forest management and timber processing and marketing, not available through other programs, continued to be given to State forestry agencies, Federal managers of forest lands, universities and schools, industrial and consulting foresters, private owners of large forest properties and to processors of forest products. Work was continued in cooperation with defense agencies in planning for emergency timber supplies.

Forestry management, utilization and marketing work in the Virgin Islands was continued to help the people there make the best use of their forest resource development and use opportunities.



Continuous-type retort converts waste wood from manufacturing plant into high grade charcoal. The waste formerly was burned.



A sawmill in a small town in the south was destroyed by fire in April 1962. The owner had no plans to replace it. An enterprising business man acquired most of the town site, including what was left of the sawmill and lumber yard. With the assistance of an ARA loan, local financing, professional forestry advice and service from the State Forester and the U.S. Forest Service, and the cooperation of local landowners, a modern sawmill was placed in operation Jan. 4, 1965. One-hundred and seventeen jobs have already been provided and the outlook for additional development and employment associated with this plant are good.

DEVELOPING PROGRAM FOR THE NATIONAL FORESTS

Cumulative Fiscal Years 1963-1966 1/
(In thousands of dollars)

1963-1966:		1963-1966 Available		Planned : Forest Service: Public: Total : Difference: Percent	
Level : Appropriation : Works :				Financed	
FOREST LAND MANAGEMENT:					
National Forest Protection and Management:					
Timber resource management:					
(a) Sales administration and management	117,311:	113,419:	--	113,419:	-3,892 :
(b) Reforestation and stand improvement	125,397:	65,327 :	5,294:	70,621:	-54,776 :
Recreation-public use	203,753:	106,634 :	10,611:	117,245:	-86,508 :
Wildlife habitat management	20,986:	14,647 :	1,637:	16,284:	-4,702 :
Range resource management:					
(a) Management	22,546:	20,480 :	--	20,480:	-2,066 :
(b) Revegetation	12,113:	10,990 :	46:	11,036:	-1,077 :
(c) Improvements	16,698:	13,188 :	1,986:	15,174:	-1,524 :
Soil and water management 3/	36,808:	23,443 :	1,206:	24,649:	-12,159 :
Mineral claims, leases, and special uses	17,112:	15,249 :	--	15,249:	-1,863 :
Land classification, adjustments, and surveys	25,302:	15,914 :	--	15,914:	-9,388 :
Forest fire protection	114,805:	92,834 :	1,187:	94,021:	-20,784 :
Structural improvements for fire and general purposes (construction and maintenance)	61,645:	45,065 :	16,715:	61,780:	+135 :
Total, National Forest Protection and Management	774,476:	537,190 :	38,682:	575,872:	-198,604 :
Insect and Disease Control:					
White pine blister rust control	16,263:	14,337 :	51:	14,388:	-1,875 :
Other pest control	28,173:	32,936 :	146:	33,082:	+4,909 :
Total, Insect and Disease Control 2/	44,436:	47,273 :	197:	47,470:	+3,034 :
Acquisition of Lands, Weeks and Special Acts 3/					
Forest Roads and Trails (including all related appropriations) (obligating authority) 3/	19,190:	6,472 :	--	6,472:	-12,718 :
TOTALS	1,281,430:	914,189 :	57,598:	971,787:	-309,643 :
1/ Excludes fiscal years 1964-1965 supplemental appropriations and obligating authority for Alaska earthquake damages; Montana and Idaho, and Pacific Northwest flood damages. Includes 1966 Pay Act proposed supplemental.					
2/ Includes \$9,875,000 for lands not administered by the Forest Service.					
3/ Includes fiscal year 1965 supplemental appropriation authorized under the Appalachian Regional Development Act of 1965 as follows: Soil and water management, \$1,000,000; Acquisition of lands, Weeks Act, \$1,000,000; Forest Roads and Trails, \$2,500,000.					

AND TRAILS

ACQUISITION
OF LANDS

(b) Forest Roads and Trails

Appropriation Act, 1966	\$101,172,000
Proposed supplemental, 1966, for increased pay costs	964,000
Base for 1967	102,136,000
Budget Estimate, 1967	102,530,000
Increase	<u>+394,000</u>

This appropriation provides for the liquidation of obligations incurred for the construction and maintenance of forest roads and trails (and the purchase of access roads) pursuant to the authorizations contained in the Federal Highway Act of 1964 and the Pacific Northwest Disaster Relief Act of 1965. An appropriation of \$102,530,000 for 1967 will provide sufficient cash to liquidate prior year obligations and obligations planned for fiscal year 1967 which must be paid by June 30, 1967.

Authorization for Appropriations a/

<u>Fiscal</u> <u>Year</u>	<u>Construction</u>	<u>Maintenance</u>	<u>Total</u>	<u>Funded</u>	<u>Unfunded</u>
1965	\$66,800,000	\$18,200,000	\$85,000,000	\$85,000,000	
1966	69,800,000	53,200,000	123,000,000	70,144,000	\$52,856,000
1967	66,800,000	18,200,000	85,000,000	102,530,000	-17,530,000
	<u>203,400,000</u>	<u>89,600,000</u>	<u>293,000,000</u>	<u>257,674,000</u>	<u>35,326,000</u>

a/ The annual appropriation language and these justifications combine the appropriation for "Forest Roads and Trails" made pursuant to 23 USC 205 and the appropriation of 10% of forest receipts for construction and maintenance of roads and trails pursuant to 16 USC 501. This merger of funds is made in order to simplify the programing, allotment, and accounting of funds at the field level. Since the accounts for these two funds are merged it is not practicable to distribute obligations and expenditures between the two appropriations on a precise basis. The amounts shown for the "Forest Roads and Trails" appropriation are a proration based on the percentage that contract authorization used under the appropriated funds is of total available funds. Expenditure amounts for maintenance are based on all such obligations requiring cash payment during the fiscal year.

Status of Unfunded Authorizations

Unfunded contract authorizations beginning of 1966:

Federal-Aid Highway Act of 1962 (PL 87-866) and	
Federal-Aid Highway Act of 1964 (PL 88-423)	\$116,992,000
Federal-Aid Highway Act of 1964, as amended (PL 89-41)	38,000,000
Appropriation, 1966	-101,172,000
Proposed supplemental, 1966, increased pay costs	-964,000
New contract authorization, 1966 (1967 authorization	
available in 1966 -- Federal-Aid Highway Act of 1964)	85,000,000
Total unfunded beginning of 1967	137,856,000
1967 Budget Estimate (cash requirements)	102,530,000
Balance to remain unfunded as of June 30, 1967	<u>35,326,000</u>

Analysis of Cash Requirements

1. Unliquidated obligations June 30, 1965	\$43,091,179	
2. Estimated cash requirements to finance 1966 program	<u>67,994,121</u>	(a)
3. Total cash requirements by June 30, 1966	<u>111,085,300</u>	
4. Less cash on hand 1966:		
Balance from 1965	\$8,949,300	
Appropriation, 1966	<u>101,172,000</u>	
5. Additional cash needed for 1966 obligations		
(supplemental proposed in fiscal year 1966)	<u>964,000</u>	
6. Obligations in 1966 for which cash was not		
provided in item 2	40,555,208	
7. Estimated cash required to finance 1967 program	<u>61,974,792</u>	(b)
8. Total cash required for 1967	<u>102,530,000</u>	

(a) An estimated 60% of the \$85,949,000 new obligations, 70% of \$20,350,000 obligations for Pacific Northwest flood damages, and \$2,250,000 for obligations incurred in the Appalachian region will require cash payments during the fiscal year.

(b) An estimated 63% of the \$82,301,000 regular program obligations and 70% of the \$15,000,000 obligations for Pacific Northwest flood damages will require cash payments during the fiscal year.

PROJECT STATEMENT

The following tabulation reflects the total program for the construction and maintenance of roads and trails on the National Forests by combining the funds available under the appropriation "Forest roads and trails" with the permanent appropriation of 10% of National Forest receipts. This permanent appropriation for "Roads and trails for States" (10% Fund) is estimated at \$14,700,000 for 1967 compared with \$14,203,671 for 1966, an increase of \$496,329.

Project	1965	1966 Estimate	Increase or Decrease		1967 Estimate
			Increased		
			Pay Costs	Other	
			(PL 89-301)		
1. Construction of roads and trails <u>a/</u>	\$68,646,119	\$82,898,000	+\$190,000	-\$2,087,000	\$81,001,000
2. Maintenance of roads and trails <u>b/</u>	36,825,453	39,855,000	+71,000	-8,926,000	31,000,000
Total obligations	105,471,572	122,753,000	+261,000	-11,013,000	112,001,000
Transfer from "Roads and Trails for States"	-13,141,263	-14,203,671	- -	+496,329	-14,700,000
Program under "Forest Roads and Trails" contract authorization	92,330,309	108,549,329	+261,000	-11,509,329	97,301,000
Obligations incurred under unfunded contract authorization	-16,358,309	-6,413,329	- -	+11,642,329	5,229,000
Total increased pay costs (PL 89-301) ..	(- -)	(964,000)	(+261,000)	(- -)	(1,225,000)
Total available or estimate <u>c/</u>	75,972,000	102,136,000	+261,000	+133,000	102,530,000
d/					

a/ Includes obligations incurred for Appalachian region under Second Supplemental Appropriation Act, 1965 (PL 89-16) approved 4/30/65:

1965	\$ 250,000
1966	2,250,000

b/ Includes obligations incurred under Pacific Northwest Disaster Relief Act of 1965 (PL 89-41) approved 6/17/65:

1965	\$2,650,000
1966	20,350,000
1967	15,000,000

Also includes \$8,450,000 obligations incurred for Pacific Northwest flood damages under the Federal-Aid Highway Act of 1964.

c/ Includes following cash amounts provided in Second Supplemental Appropriation Act, 1965 (PL 89-16) approved 4/30/65:

Construction, Appalachian region	\$2,500,000
Maintenance, Pacific Northwest flood damages..	2,000,000

d/ Includes supplemental for \$22,500,000.

Estimated obligations for Appalachian region (funds in connection with Appalachian Regional Development Act of 1965):

1965, \$250,000	1966, \$2,250,000	1967, \$2,250,000
-----------------	-------------------	-------------------

An increase of \$394,000, including \$261,000 to place 1966 pay costs on a full-year basis, is needed to meet cash requirements for liquidation of contract authorization. This appropriation provides for the liquidation of obligations incurred for the construction and maintenance of forest roads and trails pursuant to the authorization contained in the Federal-Aid Highway Act. An appropriation of \$102,530,000 for 1967 is required to:

- (1) Pay for obligations of the prior year which will be due for payment in fiscal year 1967.
- (2) Pay the portion of 1967 obligations of \$98 million contract authorization which will require cash payment in that year. This includes \$85 million 1967 authority less \$1.7 million advanced to fiscal year 1966 for construction of timber access roads in Appalachian region, plus \$15 million authority provided in Pacific Northwest Disaster Relief Act of 1965.
- (3) Pay for obligations incurred in connection with establishment of Whiskeytown-Trinity-Shasta and Spruce Knob-Seneca Rocks National Recreation Areas.

The level of financing will provide funds to meet the most critical needs for roads and trails required for sale of timber, for making recreation areas accessible, for faster attack on fires, and for meeting other transportation needs in the multiple-use management of the National Forests. This level of financing assumes continued contributions to the road system by timber purchasers in meeting timber marketing goals. Timber purchasers are required to build only the standard of road necessary for a prudent operator to remove

the timber. The Service will provide some additional funds to bring these roads up to the required standard for future timber sales and for recreation type travel.

The National Forest road and trail transportation system is an extension of the public highway system and is highly important in maintaining and increasing rural industries dependent on Forest resources. It permits the urban dweller to leave busy crowded highways and enjoy the beauties and recreational opportunities offered by the National Forests.

This growing use of the National Forest roads and trails places additional requirements for these facilities to be maintained in a safe and usable condition.

The major projects planned for 1967 are:

	<u>Miles</u>	<u>Amount</u>
Flood damage repairs to roads and trails ...	--	\$15,000,000
Recurrent road maintenance	188,133	13,000,000
Recurrent trail maintenance	102,947	3,000,000
Bridge construction units	195	4,920,000
Road construction	1,605	47,131,000
Trail construction	750	3,750,000
Surveys, plans and supervision of timber purchaser roads	5,000	19,800,000
Supplementary timber purchaser roads	812	3,900,000
Road purchase	--	<u>1,500,000</u>
		112,001,000

Examples of Recent Accomplishments

The June 1964 floods in Montana and Idaho plus the December 1964-January 1965 floods in California, Oregon, Washington, Idaho, and Nevada placed a tremendous workload on the areas involved. In addition, the Alaska earthquake caused considerable damage. Immediate repairs were started in all cases. Financing for these programs was provided by the Northwest Disaster Relief Act for \$38 million, deferment of planned projects, and release of reserved authorizations. This program was planned and programed as follows:

	<u>1965</u>	<u>1966</u>	<u>1967</u>
Alaska Earthquake	\$300,000		
June 1964 Flood	6,700,000	\$1,700,000	
December 1964-January 1965 Flood	13,000,000	21,350,000	\$15,000,000

Under the regular program the existing system of roads and trails used for the protection and multiple use management of the National Forests is maintained and improved and additional facilities constructed to the extent authorizations are available. In the 1963-67 period 31% of the ten-year planned program has been authorized.

The transportation system is maintained in part by State and local authorities, licensees, permittees, and purchasers of Federal timber and other Forest products. The following tabulation shows how the system was maintained in 1965:

	<u>Roads</u> (Approximate Mileage)	<u>Trails</u> Mileage)
By the Government	113,417	98,145
By Others	<u>74,716</u>	<u>4,802</u>
	188,133	102,947

During fiscal year 1965, \$20,213,000 was obligated for flood repair; \$16,612,000 for regular maintenance and \$68,647,000 for road, trail, and bridge construction. In addition, purchasers of Government timber accomplished road maintenance representing an estimated expenditure of \$7,024,000 and started construction on 4,362 miles of road estimated to cost \$56,684,000.

Construction started in 1965 was:

	<u>By the Government</u>	<u>By Timber Purchasers</u>
Roads - miles	1,613	4,362
Trails - miles	671	--
Bridges	175	--



MULTIPLE USE ROAD OF AMPLE CAPACITY FOR ALL TRAVELERS



TYPICAL LOGGING ROAD

Constructed by timber purchasers with supplementary funds by the Government to raise standard from prudent operator to multiple use.

Figure V-1



Flood Damage to Roads and Bridges
Dec. 1964 - Jan. 1965



Figure V-2



PERMANENT TYPE BRIDGE STRUCTURES ARE BEING
CONSTRUCTED TO REPLACE TEMPORARY BRIDGES



Figure V-3

(c) Access Roads

PROJECT STATEMENT

Project	1965	1966 Estimate	1967 Estimate
Access roads	\$817,771	\$63,224	- -
Unobligated balance			
start of year ..	-847,440	-63,224	- -
Recovery of prior years			
obligations	-33,556	- -	- -
Unobligated balance end of			
year	63,224	- -	- -
Total available or estimate	- -	- -	- -

The unobligated balance of \$63,224 from the fiscal year 1962 appropriation will be fully obligated during fiscal year 1966. During fiscal year 1965, 16 cases were obtained involving 321 miles of new land easements or rights-of-way over existing roads or interests in existing roads. An estimated 12 miles will be obtained in fiscal year 1966.

This appropriation was eliminated in fiscal year 1964 and future access road purchase, beyond that to be accomplished with the balance remaining in this appropriation, will be accomplished under the Forest Road and Trail appropriation.

(d) Acquisition of Lands for National Forests, Special Acts

Appropriation Act, 1966	\$30,000
Budget Estimate, 1967	<u>80,000</u>

PROJECT STATEMENT

Project	1965	1966	Increase	1967 Estimate
1. Cache National Forest, Utah	\$10,000	\$20,000	- -	\$20,000
2. Uinta and Wasatch National Forests, Utah	14,730	20,000	- -	20,000
3. Toiyabe National Forest, Nevada	- -	8,000	- -	8,000
4. Cleveland National Forest, San Diego County (California).....	8,000	- -	- -	- -
5. San Bernardino-Cleveland National Forests (Riverside County), (Califor- nia)	8,000	- -	- -	- -
6. Sequoia National Forest, California	326	32,000	- -	32,000
Unobligated balance reverted to National Forests Fund	28,945	- -	- -	- -
Total available or estimate	70,000	80,000	- -	80,000

The Congress has enacted several special laws which authorize appropriation from the receipts of certain specified National Forests for the purchase of lands to minimize erosion and flood damage. Appropriations under four of these special acts for 1966 are:

Forest and Act

Cache (Utah), Act of May 11, 1938, as amended	\$20,000
Uinta-Wasatch (Utah), Act of August 26, 1935, as amended	20,000
Toiyabe (Nevada), Act of June 25, 1938, as amended	8,000
Sequoia (California), Act of June 17, 1940	32,000
Total	<u>80,000</u>

There are critical watershed lands needing soil stabilization and vegetative cover restoration to prevent serious erosion and damaging floods within these National Forests. Land treatment measures must be applied and subsequently maintained on all lands in these areas to make corrective action fully effective. To assure full program effectiveness, the intermingled private lands must be acquired by the Federal Government.

During fiscal year 1965, 3,462 acres of land were purchased under the special purchase authorities applying to the Cache, Uinta and Wasatch National Forests in Utah.

In this same period, 160 acres of land were purchased in the National Forests of southern California under special laws enacted in 1938 and 1940. These acquisitions help to protect steep, critically valuable watersheds lying immediately above heavily-populated urban areas.

Cache National Forest. In fiscal year 1965, funds were available from two sources for purchase of lands within the Cache National Forest in Utah.

1. The Receipts Act of May 11, 1938, as amended -- \$10,000.
This is an annual appropriation.
2. The Act of July 24, 1956 -- \$200,000 appropriated under this authority in fiscal years 1957 through 1960. These funds remain available until expended. Through fiscal year 1965, \$176,790 has been obligated from this appropriation.

These funds are used to acquire key tracts of land in the steep, rough, and highly important watershed areas lying north of the Ogden River, along the Wasatch front and on Wellesville Mountain of the Cache National Forest. These are rugged mountain lands above the river valley which have been damaged and their watershed functions impaired through forest fires or overgrazing. This contributes to excessive rainfall runoff causing severe erosion. The damaged watershed lands are potential sources of floods and mudrock flows. Many tracts of land are located in the north fork of Ogden River and on the drainage of Pineview Reservoir, a Federal reclamation project. Others are within the watersheds of the city of Ogden and the other small towns along the Wasatch front. Public ownership of these lands and the subsequent restoration and protection of their vegetative cover is a highly important part of a vigorous cooperative program with the local community and agencies.

The 1956 Act requires that expenditures of Federal funds be matched by contributions by local agencies or people. This requirement has been met through donations of lands valued at \$185,000. Additional contributions are expected in fiscal year 1966.

The appropriation of \$10,000 under the Act of May 11, 1938 is from receipts of the Cache National Forest. In the absence of this appropriation, the local counties would receive 25% of these receipts for roads and school purposes. Therefore, the local counties, in effect, are contributing one-fourth of the amount of this appropriation. These appropriations are extremely important to the continuation of a vital and worthwhile program extending over twenty years and shared in by both the local agencies and the Federal Government through the National Forests.

Through fiscal year 1965, 29,363 acres have been approved for purchase pursuant to the Receipts Act of 1938, and 15,014 acres under the Special Act of 1956. The 1966 objective is to acquire 1,500 additional acres of these critical watershed lands.

Uinta-Wasatch. In fiscal years 1963 through 1966, an appropriation of \$80,000 was made under the Uinta-Wasatch Receipts Act of August 26, 1935 for acquiring critical watershed lands in the American Fork Canyon watershed. A total of 1,425 acres has been approved for purchase through fiscal year 1965 and an estimated 700 acres will be acquired during 1966. It is estimated that it will take from four to five years to complete the necessary American Fork acquisitions.

Sequoia National Forest. In fiscal year 1966, \$32,000 was appropriated under this act to begin a program of acquiring critical watershed lands. It is estimated that approximately 300 acres will be purchased during 1966.

(e) Acquisition of Lands for Uinta National Forest

Appropriation Act, 1966	- -
Budget Estimate, 1967	<u>\$300,000</u>
Increase	<u>+300,000</u>

PROJECT STATEMENT

	:	1965	:	1966	:	Increase	:	1967
	:		:		:		:	Estimate
Acquisition of lands for Uinta	:		:		:		:	
National Forest	:	- -	:	- -	:	+\$300,000	:	\$300,000

Public Law 89-226 authorizes the Secretary of Agriculture to acquire approximately 10,000 acres of non-Federally owned land within a described part of the Uinta National Forest in Utah for the purpose of promoting the control of floods and the reduction of soil erosion through restoration of adequate vegetative cover. The lands to be acquired are located on the South Fork of the Provo River and constitute the watershed from which the City of Provo draws its municipal water supply. The lands are intermingled with, and surrounded by, National Forest land which is now the property of the United States and acquisition of the 10,000 acres authorized by Act would consolidate the National Forest area and not only serve to halt erosion and promote flood control, but facilitate administration of the National Forest.

The lands proposed for acquisition have been used for grazing domestic livestock for many years. A gradual attrition of the more desirable plant species and a materially reduced density of the ground cover on steep slopes have resulted in sheet erosion and numerous small active gullies. Most of the tributary drainages show gully erosion with active cutting along the steeper portions. Deposits of silt and debris of recent origin indicate deterioration of the watershed. If the lands are acquired, it will be necessary to limit and, in some instances, perhaps exclude grazing for varying periods of time in order to allow for reestablishment or recovery of the natural vegetative cover. Some watershed improvement work such as artificial reseeding may also be necessary. It is believed that the necessary rehabilitation work can be accomplished largely through intensified land management.

Most of the lands which would be acquired are in a single ownership and are available for purchase. The cost of all lands proposed for purchase is estimated to be \$300,000.

CHANGE IN LANGUAGE

The estimates include proposed new language for this item as follows:

For the acquisition of land in the Uinta National Forest, Utah, in accordance with the Act of October 1, 1965 (79 Stat. 899), \$300,000, to remain available until expended.

The proposed language would appropriate funds for the purchase of lands within the boundary of the Uinta National Forest in accordance with recently passed legislation as discussed above.

(f) Acquisition of Lands for Wasatch National Forest

PROJECT STATEMENT

Project	:	1965	:	1966	:	1967 Estimate
Acquisition of lands for Wasatch National Forest	:	\$109,005	:	\$111,309	:	- -
Unobligated balance brought forward	:	-70,314	:	-111,309	:	- -
Unobligated balance carried forward	:	111,309	:	- -	:	- -
Total or estimate available	:	150,000	:	- -	:	- -

The Act of September 14, 1962 (Public Law 87-661) provided authorization for the appropriation of \$400,000 for purchase of privately owned lands within the Wasatch National Forest in Utah. The full amount of this authorization has been appropriated with the funds remaining available until expended.

The purchase of 2,411 acres of land was approved in 1965. It is expected that most of the remaining 8,500 acres will be acquired in 1966.

(g) Acquisition of Lands for Superior National Forest

PROJECT STATEMENT

Project	1965	1966	1967 Estimate
Acquisition of lands for Superior National Forest	\$213,924	\$325,292	- -
Unobligated balance brought forward	-539,216	-325,292	- -
Unobligated balance carried forward	325,292	- -	- -
Total or estimate available	- -	- -	- -

The Act of June 22, 1948 (Public Law 80-733) as amended, provided authorization for the appropriation of \$4.5 million for the purchase of lands and improvements thereon in the Boundary Waters Canoe Area, Superior National Forest, Minnesota. The full amount of this authorization has been appropriated with the funds remaining available until expended.

The legislation authorized and directed the Secretary of Agriculture to acquire any properties which in his opinion should be in Federal ownership in order to restore and preserve the wilderness character of the remaining canoe country along the Canadian boundary in Minnesota. Only about six cases remain in which further negotiation is warranted or where additional work is required preparatory to condemnation action.

(h) Acquisition of Lands for Cache National Forest

PROJECT STATEMENT

Project	:	1965	:	1966	:	1967 Estimate
Acquisition of lands for Cache National Forest	:	\$3,198	:	\$23,210	:	- -
Unobligated balance brought forward	:	-26,408	:	-23,210	:	- -
Unobligated balance carried forward	:	23,210	:	- -	:	- -
Total or estimate available	:	- -	:	- -	:	- -

The 1956 Appropriation Act provided \$200,000 for the acquisition of lands in the Cache National Forest pursuant to the Act of July 24, 1956 (70 Stat. 632). Obligations under this fund are in addition to the appropriation from National Forest receipts authorized by the Act of May 11, 1938 and provided in the appropriation, "Acquisition of Lands for National Forests, Special Acts". Under the 1956 Act, funds appropriated must be matched by contribution of funds or land by local agencies or persons. Explanation of this program is included within the Status of Program for "Special Acts".

(i) Cooperative Range Improvements

Appropriation Act, 1966 and base for 1967	\$700,000
Budget estimate, 1967	<u>700,000</u>

Part of the grazing fees from the National Forests, when appropriated, are used to protect or improve the productivity of the range, mainly by construction and maintenance of fences, stock-watering facilities, bridges, corrals and drive-ways. These funds are advanced to and merged with the appropriation "Forest protection and utilization"; subappropriation "Forest land management".

FORMULA FOR APPROPRIATION

Section 12 of the Act of April 24, 1950 (Granger-Thye Act) provides that of the moneys received from grazing fees by the Treasury from each National Forest during each fiscal year there shall be available at the end thereof when appropriated by Congress an amount equivalent to 2 cents per animal month for sheep and goats and 10 cents per animal month for other kinds of livestock under permit on such National Forest during the calendar year in which the fiscal year begins.

The appropriation for this item since fiscal year 1951 has been \$700,000, except for fiscal years 1954 and 1955 when \$531,000 and \$400,000 were appropriated. Since the actual use figures are not available until after more than one-half of the fiscal year for which funds are appropriated has elapsed, the 1967 appropriation request of \$700,000 necessarily represents the best current approximation of the amount which will become available in the calendar year 1966 under the animal-months-of-use formula.

For calendar year 1964, the latest available figures, use amounted to 5,492,216 animal months for cattle and horses; 5,777,189 animal months for sheep and goats; and 126 for swine. This use under the 2 cents and 10 cents formula calculated to \$664,778.

(j) Assistance to States for Tree Planting

Appropriation Act, 1966 and base for 1967	\$1,000,000
Budget Estimate, 1967	<u>1,000,000</u>

PROJECT STATEMENT

Project	1965	1966 Estimate	Increase	1967 Estimate
Assistance to States for tree planting	\$998,058	\$1,019,576	-\$19,576	\$1,000,000
Unobligated balance, start of year ...	-17,634	-19,576	+19,576	- -
Unobligated balance, end of year	19,576	- -	- -	- -
Total increased pay costs (P.L. 89-301)	(- -)	(3,400)	(+1,300)	(4,700)
Total available or estimate	1,000,000	1,000,000	- -	1,000,000

This program helps provide for the Nation's expanding future needs for industrial wood through financial and technical assistance to the States in carrying out a Federal-State cost sharing program of planting, seeding, or other forestation work on non-stocked or under-stocked non-Federal commercial forest land. In addition, important side benefits are derived such as added employment in depressed areas, beautification of the country-side and expanded multiple-use opportunities. In fiscal year 1966 about 100,000 acres will be treated, and work on the production of improved seed will be done in 13 States. Nearly 20,000 man-months of employment will be provided by this rate of planting and seed production work. Conservative estimates indicate a need for planting 70 million acres of non-Federal land in the United States. At the present rate of all tree planting (1,035,000 acres annually), it will take 70 years to complete the job. This rate of progress is slow in relation to the need for improvement of the economically depleted areas in which these lands are located. There is also a pressing need for genetically improved seed which will produce faster growing trees of higher quality and with greater resistance to disease. This program is authorized under

Title IV of the 1965 Agricultural Act. It is designed to help the States accelerate forestation of non-Federal public lands and private lands for the production of industrial wood. (See Figure W-1.) Approved State plans propose the forestation of over 1.2 million acres mainly of State-owned and county forest land and other forestation work related to the production and processing of improved seed and nursery production in 34 States at an estimated cost of \$40 million. This program will help materially with improvement of the overall economic development of many rural areas. Furthermore, the Assistance to States for Tree Planting Programs will furnish work opportunities that will supplement the objectives of the Economic Opportunity Act of 1964.

Generally, the areas in need of tree planting on the non-Federal public lands are in depleted condition, much of it covered with undesirable brush and shrubs that require costly site preparation work prior to planting or seeding to commercial forest tree species. The accomplishments under this program often serve as demonstrations that encourage adoption of appropriate planting practices. This program enables the States to double their tree planting program on State-owned forest lands and to make effective progress in the production of genetically improved seed.

<u>1964 Accomplishments by States</u>	
<u>State</u>	<u>Acres Treated</u>
Arkansas	727
Florida	4,595
Georgia	566
Hawaii	2,730
Idaho	157
Illinois	153
Indiana	143
Iowa	360
Kentucky	294
Louisiana	85
Maine	2,052
Maryland	331
Massachusetts	58
Michigan	11,195
Minnesota	12,152
Mississippi	2,138
Missouri	2,636
Montana	1,125
New Hampshire	85
New Jersey	8,612
North Carolina	20
Ohio	1,218
Oregon	16,466
Pennsylvania	1,750
Rhode Island	44
South Carolina	5,811
Tennessee	418
Texas	900
Vermont	17
Washington	9,973
Wisconsin	2,545

During 1965 New York State came into the program. They plan tree planting on State and county forest lands in addition to their regular forestation program.



A Forest Service geneticist assisting a State Forestry technician develop grafted stock from selected trees with superior characteristics. This stock will be planted in a seed orchard where genetically improved seed will be produced for future reforestation work.



A helicopter seeding a burned area on a State Forest in a Northwestern State.



Area direct-seeded and treated for control of undesirable hardwoods.

(k) Timber Development Organization Loans and Technical Assistance

Appropriation Act, 1966 and base for 1967	- -
Budget Estimate, 1967	\$500,000
Increase	<u>+500,000</u>

SUMMARY OF INCREASE

	1966 Available	Increase	1967 Estimate
For loans and related expenses in Appalachian region	- -	+\$400,000	\$400,000
To provide technical assistance to timber development organizations	- -	+100,000	100,000
Total	<u>- -</u>	<u>+500,000</u>	<u>500,000</u>

PROJECT STATEMENT

Project	1965	1966 Estimate	Increase	1967 Estimate
Loan and related expenses	- -	\$600,000	+\$100,000	\$700,000
Technical assistance	\$50,000	50,000	+50,000	100,000
Unobligated balance, start of year	- -	-950,000	+650,000	-300,000
Unobligated balance, end of year	950,000	300,000	-300,000	- -
Total increased pay costs (P.L. 89-301) .	(- -)	(1,500)	(+500)	(2,000)
Total available or estimate	<u>1,000,000</u>	<u>- -</u>	<u>+500,000</u>	<u>500,000</u>

An increase of \$500,000 in appropriations is needed for the following purposes:

a. \$400,000 for loans and related expenses to provide up to one-half of the initial capital required for timber development organizations through loans under applicable provisions of the Consolidated Farmers Home Administration Act of 1961, and as authorized under authority of the Appalachian Regional Development Act of 1965. The loans will be used to supplement private capital required for the establishment of the private, non-profit timber development organization under State laws. These organizations will provide management services (a) to improve timber productivity and quality, and (b) to increase returns to timber landowners in the Appalachian area. The organization will follow sound management practices and seek outlets for the timber produced. It is estimated that 3 to 4 timber development organizations would be established during fiscal year 1967.

b. \$100,000 to provide technical assistance in establishing and operating proposed private, non-profit timber development organizations. It is expected that some of this technical assistance will be provided through the use of State forestry agencies but with financing of their "out-of-pocket" expenses from this appropriation. It will include costs for feasibility studies for specific areas having potential prospects for successful operation of timber development organizations. It is estimated that 3 to 4 feasibility studies will be made during fiscal year 1967, at a cost of \$20,000 to \$40,000 each.

Loans are needed to help local timber development organizations become established and to sustain them until they have had a good chance for long-term success. Technical, business and managerial assistance to timber development organizations is needed for:

1. Feasibility studies to determine the suitability of potential locations;
2. Establishment of the organizations; and
3. Technical guidance until the enterprises are operating successfully.

In many areas of the Appalachian region, a chronic condition of underdevelopment and severe unemployment exists. As a result, many people are denied reasonable economic and cultural opportunities. In addition, the productive force in both physical and human resources is severely limited in its contribution to the Nation, while the costs of essential welfare services are steadily increasing. Technological advances have displaced the employment opportunity of many workers. This situation can be alleviated through purposeful and dynamic use of resources and technology available to us today. This region has great resources. Its people are productive and self-reliant.

At one time the Appalachian Region was a center of lumber production. But when the lumber industry had harvested the virgin forests, production was drastically reduced. In its wake was left large areas of cut-over forest lands that have taken decades to regenerate to the extent that they can once again be regarded as usable resources. For these reasons, special supplementary forestry programs are being provided for the Appalachian region.

CHANGE IN LANGUAGE

The estimates include proposed new language for this item as follows:

For loans under the applicable provisions of the Consolidated Farmers Home Administration Act of 1961 (7 U.S.C. 1926 et seq.) and for related expenses and technical forestry assistance, as authorized by section 204 of the Appalachian Regional Development Act of 1965 (79 Stat. 13), \$500,000 to remain available until expended.

The proposed language would provide for financing timber development organization loans and technical assistance in the regular appropriation request for 1967. Funds for financing such loans and technical assistance in fiscal years 1965 and 1966 were provided in the Second Supplemental Appropriation Act, 1965 (79 Stat. 81).

ADMINISTRATIVE PROVISIONS, FOREST SERVICE

Changes in Language

Changes in the language of this item are proposed as follows. New language is underscored. Deleted matter is enclosed in brackets.

Appropriations to the Forest Service for the current fiscal year shall be available for: (a) purchase of ~~not~~ to exceed one hundred
1 and [nine] sixty-five passenger motor vehicles of which one hundred
2 and [one] fifteen shall be for replacement only, and hire of such
vehicles; operation and maintenance of aircraft and the purchase of
3 not to exceed [six] four for replacement only; (b) employment pursuant to the second sentence of section 706(a) of the Organic Act of 1944 (5 U.S.C. 574), and not to exceed \$25,000 for employment under section 15 of the Act of August 2, 1946 (5 U.S.C. 55a); (c) uniforms, or allowances therefor, as authorized by the Act of September 1, 1954, as amended (5 U.S.C. 2131); (d) purchase, erection, and alteration of buildings and other public improvements (5 U.S.C. 565a); (e) expenses of the National Forest Reservation Commission as authorized by section 14 of the Act of March 1, 1911 (16 U.S.C. 514); and (f) acquisition of land and interests therein for sites for administrative purposes, pursuant to the Act of August 3, 1956 (7 U.S.C. 428a).

Except to provide materials required in or incident to research or experimental work where no suitable domestic product is available, no part of the funds appropriated to the Forest Service shall be expended in the purchase of twine manufactured from commodities or materials produced outside of the United States.

Funds appropriated under this Act shall not be used for acquisition of forest lands under the provisions of the Act approved March 1, 1911, as amended (16 U.S.C. 513-519, 521), where such land is not within the boundaries of an established national forest or purchase
4 unit [nor shall these lands be acquired without approval of the local government concerned].

The first and second changes would provide authority for the Forest Service to purchase 165 passenger motor vehicles of which 115 will be replacements. The justification of this need appears in the following pages.

The third change would provide authority for the Forest Service to acquire four aircraft, by purchase, for replacement only. The justification of this need appears in the following pages.

The fourth change would remove the requirement for approval by local governments of forest land acquisitions under the Weeks Act. The Land and Water Conservation Fund Act of 1965 provides major financing for the purchase of lands having a primary value for recreation. The Act states:

The purposes of this Act are to assist in preserving, developing, and assuring accessibility to all citizens of the United States of America of present and future generations and visitors such quality and quantity of outdoor recreation resources as may be available and are necessary and desirable for individual active participation in such recreation and to strengthen the health and vitality of the citizens of the United States

The present language of the administrative provisions section makes it possible for a local government or official to estop purchase of significant tracts of land urgently needed for recreation or other purposes, even though the private landowner has voluntarily offered the property to the United States. This has occurred several times in the past. This change would permit the purchase of such land without local approval thereby allowing vital programs to go forward.

PASSENGER MOTOR VEHICLES

Purchase of passenger motor vehicles

During fiscal year 1967, it is proposed to replace 115 passenger vehicles. Of these, 102 will meet replacement standards and 13 will require replacement because of accidents ~~or~~ excessive maintenance costs. It is also proposed to purchase 50 additional passenger cars. Of these, 40 will be used as replacements or in lieu of additional one-half ton pickups and carryalls which are more expensive. The other 10 passenger motor vehicles will be additions to the Service-wide fleet to meet expanding program needs.

The Forest Service had 656 passenger carrying vehicles at the start of fiscal year 1966. It will add eight units to its fleet during the fiscal year, making a total of 664 units available at the start of fiscal year 1967, excluding possible transfer to other agencies. It is proposed that the total number of passenger carrying vehicles be increased to 714 by the end of fiscal year 1967. Due to program needs, it may be necessary to replace sedans with station wagons or vice versa, but this would not change the total number of passenger motor vehicles scheduled for replacement or addition.

As of June 30, 1965, the age and mileage classes of the Forest Service net active fleet, exclusive of two busses, were:

<u>Age Data</u>		<u>Mileage Data</u>	
<u>Year</u>	<u>No. of Vehicles</u>	<u>Miles</u>	<u>No. of Vehicles</u>
1960 and older	33	60,000 and over	31
1961	66	50,000 to 59,999	66
1962	142	40,000 to 49,999	91
1963	165	30,000 to 39,999	130
1964	129	20,000 to 29,999	142
1965	121	10,000 to 19,999	67
		0 to 9,999	129
Total	656	Total	656

Justification for Substitution of Passenger Carrying Vehicles for Light Trucks

Currently, the Forest Service operates 528 sedans and 128 station wagons. In addition, the Forest Service has 7,744 one-half to one ton trucks. It is now possible to advantageously substitute some passenger carrying vehicles for pickups and carryalls. The pattern of utilization in some areas requires a sedan or station wagon-type vehicle in lieu of a truck.

The sedan or station wagon costs less to operate and maintain than a truck. For example, it costs the Forest Service 5.42 cents per mile to operate a sedan and 5.83 cents per mile to operate a station wagon in the Great Lakes area, whereas it costs 8.09 cents per mile to operate a one-half ton pickup or 8.75 cents per mile to operate a one-half ton carryall in the same area. This type of cost differential between passenger cars and light trucks holds true in other parts of the country. If the Forest Service could substitute 40 passenger cars for light trucks, this would result in a savings of about \$11,880 per year.

Use of Vehicles

Passenger motor vehicles are used by (1) forest officers in the protection, utilization, management, and development of the National Forests and Land Utilization Projects and in the program for control of forest pests; (2) research technicians on experimental forests and ranges, on field research projects and forest surveys; (3) foresters engaged in carrying out the laws providing for State and private forestry cooperation; and (4) Regional Office field-going administrative personnel in performing, directing, and inspecting field work.

The Forest Service is essentially a field organization and its passenger motor vehicles are located mainly at Regional, National Forest, and Ranger District headquarters, and experimental forests and ranges. There are over 225 million acres within the exterior boundaries of the National Forests.

About 435 million acres of State and private forest land are included within the areas which benefit from Federal participation in the cooperative forest program. Much of this area is without common carrier service, and most forest areas and research centers are remote from commercial travel routes, requiring extensive use of motor vehicles as a means of transportation. The major portion of transportation needs, particularly at forest Regional and Supervisor levels and at other larger headquarters involves multiple passenger use and can be more expeditiously and economically met by use of sedans and station wagons than by other types of vehicles.

Justification of Replacements

Dependability of passenger vehicles is an important factor in keeping work programs on schedule and in meeting emergencies. Vehicle breakdowns while on field travel cause disruptions and delays in field work as well as loss of effective work time of employees. The continued use of over-age equipment is undesirable from a safety standpoint since most of it is operated over rough, narrow, winding roads in mountainous country under adverse conditions. This use generally results in excessive operating and repair expenses when vehicles reach or exceed replacement standards.

In order to maintain passenger cars in a safe and satisfactory operating condition, it is the policy of the Forest Service to schedule periodic preventive maintenance inspections, services, and tune-ups to reduce the necessity for costly repairs and major overhauls, and to minimize lost time resulting from field breakdowns.

It is desirable to maintain a reasonable balance in the age class of the passenger vehicle inventory. The age class distribution is based upon conforming with replacement standards which recognize that some units will be retired under the age standard and others under the use standard. Prescribed replacement standards, although applicable, are not always appropriate for all Forest Service vehicles because of the wide range of operating conditions and the comparatively short field season in many of the National Forests at higher elevations. Decision on replacement of passenger vehicles which reach replacement age is based on an appraisal of each unit. This involves a review of the history record combined with a mechanical inspection of the vehicle's condition and repair liability. When such appraisal indicates that the vehicle is satisfactory for further service without unreasonable repair expenditures, it is retained and assigned to lighter work, even though such action tends to upset the age standards for the fleet inventory.

The vehicles selected for replacement are those which cannot be operated another season without excessive repair expense. They are unsatisfactory for further use both as to safety and mechanical condition. The replacement authorization requested is within the normal annual replacement standards prescribed by the General Services Administration.

Essentially all passenger motor vehicles are pooled for use by all activities with replacement of pooled units financed from a Working Capital Fund. All appropriations reimburse this fund in ratio to use of vehicles on activities financed by the respective appropriations.

None of the replacements requested will be assigned to areas served or scheduled to be served by Inter-Agency Motor Pools.

Justification of Additions

The Forest Service analyzes current work plans and program in determining its overall passenger car requirements. This analysis includes a careful study of the number of vehicles needed at each field station, using as a guiding principle the ownership of only the minimum number of dependable units required to serve programs for which funds are budgeted. Also, it is Forest Service policy to utilize Inter-Agency Motor Pools or commercial car rental services to the fullest practicable extent. Passenger car use is restricted and is integrated with various activities so as to attain good utilization of all vehicles. Expanding activities in research, timber sales, public use of recreational facilities, fire protection, and other land management activities are increasing the need for more passenger cars. These increasing needs are being met in some areas through greater use of Inter-Agency Motor Pool vehicles. These pools, however, serve only very small parts of the total land area administered by the Forest Service; therefore, increasing requirements for passenger car transportation in several areas cannot be fully met except through purchase of additional units for the Forest Service fleet. None of the additions requested will be assigned to areas served or scheduled to be served by Inter-Agency Motor Pools.

Additions are financed from program funds in direct relationship to the anticipated use of the equipment. Distribution of costs to appropriations is based on analysis of use of the equipment fleet for the past three years and the estimated use for the budget year.

AIRCRAFT

Replacement and Addition of Aircraft

The 1967 estimates propose replacement of four aircraft by purchase and four by transfer from other agencies as available. The Forest Service currently has 57 aircraft:

- 9 single-engine reconnaissance and transport airplanes
- 10 light twin-engine reconnaissance and transport airplanes
- 14 medium and heavy cargo and transport airplanes (10 medium,
4 heavy)
- 22 T-34B lead airplanes (2-place scout)
- 1 helicopter
- 1 forest spray airplane (Pawnee)

One light twin-engine airplane has been modified, equipped and is being used to develop fire mapping with infrared equipment in low visibility of smoke and at night. Results have been favorable with limited operational use planned for next season. The other reconnaissance and transport aircraft are used primarily to transport firefighters, smokejumpers, administrative personnel, equipment and supplies to remote and inaccessible areas where commercial service is inadequate, or not available for detection and suppression of forest fires. They are also used to locate and survey timber stand and vegetation conditions, such as insect infestations, **blowdown**, diseased areas, undesirable species, and to appraise resources and damage, and evaluate effectiveness of control.

The T-34B "lead" airplanes are primarily a single-purpose military model aircraft used by air tanker bosses to direct and control the dropping of fire retardants on forest fires by more than 150 tanker aircraft usually contracted from private owners.

The helicopter is used for training forest personnel in tactical use of helicopters and experimental development of techniques and equipment for direct tactical suppression of forest fires.

The replacements requested will be primarily light twin-engine airplanes. They will be utility airplanes that may be used for several purposes, such as lead planes for air tankers, small paracargo dropping, reconnaissance, and transporting freight and passengers. These will be new standard manufactured airplanes to upgrade with greater utility some old surplus T-34B's and single-engine reconnaissance airplanes which have reached an age in total number of flying hours where it is uneconomical to overhaul or modernize them to meet civil airworthiness requirements. These replacements will provide a more effective operation, with the wider twin-engine operation safety margin. Forest Service aircraft are operated to a large extent over rough mountainous terrain where landing fields are poor and few. It is especially important that these aircraft be maintained for maximum performance and dependability to provide an adequate standard of safety.

Other aircraft currently in use may be replaced as newer and more suitable models and types become available from military services as excess property. They would be obtained on transfer without reimbursement and would not increase the fleet beyond 57 aircraft. When aircraft are partially or completely destroyed in a crash accident they may be replaced out of any available fund. Many current Forest Service aircraft were manufactured during World War II, and obtained from military surplus. Most of these planes have nearly reached their limit of useful age. The military services have a few types of aircraft which have more potential suitability for Forest Service work that may become surplus in the near future. At present one medium cargo and personnel transport has reached the limit of economical usefulness.

(1) Roads and Trails for States, National Forests Fund

Appropriation, 1966 and base for 1967	\$14,203,671
Budget Estimate, 1967	<u>14,700,000</u>
Increase (due to an estimated increase in National Forest receipts in fiscal year 1966)	<u><u>496,329</u></u>

The permanent appropriation of 10% of National Forest receipts pursuant to the Act of March 4, 1913 (16 USC 501) is transferred to and merged with the annual appropriation for "Forest Roads and Trails." The explanation of the use of these funds is included in the justification for that appropriation item.

(m) Expenses, Brush Disposal

Appropriation, 1966 and base for 1967	\$8,500,000
Budget Estimate, 1967	<u>8,600,000</u>
Increase	<u><u>100,000</u></u>

PROJECT STATEMENT

Project	: 1965	: 1966	: : 1967,
	: Estimate	: Increase	: Estimate
Brush disposal	:\$8,536,170	:\$8,500,000	: \$100,000 : \$8,600,000
Unobligated balance,	:	:	:
start of year	:-8,971,944	:-9,987,145	: - - : -9,987,145
Unobligated balance,	:	:	:
end of year	: 9,987,145	: 9,987,145	: - - : 9,987,145
Total increased pay costs (P.L.	:	:	:
89-301)	: (- -)	: (143,000)	: (155,000) (198,000)
Total available or estimate	: 9,551,371	: 8,500,000	: 100,000 : 8,600,000

Timber cutting normally increases the fire hazard because of dry fuel increase in the form of logging slash. This slash may also contribute to the buildup of insect populations, increase certain disease infestations, and cause damage to stream channels.

National Forest timber sale contracts require treatment of debris from cutting operations or deposit of funds to pay for the work. When economical and expedient the work is performed by the timber purchaser. If it is not feasible for the purchaser to do the work, it is done by the Government using deposits made by the timber purchaser to cover costs of the work as authorized under Section 6 of the Act of April 24, 1950, (16 U.S.C. 490).

The effect of timber cutting and the manner of treating slash vary widely among Regions. In the three eastern Regions, volume cut per acre is relatively low, utilization is high, and generally, humid atmospheric conditions result in rapid decomposition of debris so little slash disposal work is necessary. An exception occurs in some sales where a heavier cut per acre is made, such as the jack pine stands of Minnesota. In such areas, slash is broken up and mixed with mineral soil by discing with heavy equipment. This reduces the hazard and provides a good seed-bed to aid regeneration. Treatment of slash to prevent insect epidemics is sometimes necessary in these areas.

In contrast, the cost of slash abatement on most sale areas of the West is high. High volumes per acre generally produce heavy slash. Long dry periods with much lightning and man-caused fire risk result in extremely hazardous fire potential. The warm, humid condition necessary for rapid slash deterioration seldom occurs so more intense slash disposal is required. Treatment

varies greatly with different methods of cutting. Clear-cut areas are broadcast burned. In selectively cut areas, debris may be piled for burning over the whole area or in strips which serve as firebreaks.

While slash disposal follows general prescriptions within Regions, individual needs of each sale offering are planned and appraised prior to advertisement and appropriate specific requirements are incorporated into each timber sale contract. In each instance the method used is the one which will attain adequate protection of the area at the least expense. In some instances adequate protection from fire is attained by providing additional protection until the slash hazard reverts to near normal. Logging debris which may move into water courses under these conditions must be removed. Greater intensity of fire protection for several years and occasional stream clearance may be less costly than complete slash disposal immediately after cutting. In such cases Brush Disposal funds are used to provide the needed manpower and facilities.

(n) Forest Fire Prevention

Appropriation, 1966 and base for 1967	\$32,000
Budget Estimate, 1967	<u>32,000</u>

PROJECT STATEMENT

Project	: 1965	: 1966	: Increase	: 1967
	: Estimate	: Estimate		: Estimate
Forest fire prevention	:\$30,292	:\$37,000	:\$5,000	:\$42,000
Unobligated balance, start of year	:-44,316	:-45,041	:\$5,000	:-40,041
Unobligated balance, end of year	: 45,041	: 40,041	:-10,000	: 30,041
Total increased pay costs (P.L. 89-301) :	(- -)	(425)	(175)	(600)
Total available or estimate	: 31,016	: 32,000	: - -	: 32,000

The purpose of the project is public education on the need for the prevention of man-caused wildfires on all the Nation's forests and rangelands. Its goal is the further reduction of man-caused forest fires on all ownerships to the point where their impact on natural resource management programs is negligible.

This project is accomplishing its purpose in two ways:

1. By the dissemination to the public of Smokey Bear's forest fire prevention messages on commercial products licensed by the Chief of the Forest Service.
2. By support of the Smokey Bear Junior Forest Rangers and of the Smokey Bear Awards program through the contribution of fees and royalties by licensees.

The Smokey Bear licensing program is an important part of the Cooperative Forest Fire Prevention Campaign which has been in effect for 24 years. The campaign itself has been conducted each year since 1942 as a cooperative project of the State Foresters and the Forest Service, United States Department of Agriculture, and is a public service program of the Advertising Council. The campaign utilizes the free public service resources of the various national advertising channels such as car cards, poster display systems, radio and television networks, and magazine and newspaper allocation plans in developing public cooperation in the prevention of man-caused forest fires. Since 1945, this campaign has been built around Smokey Bear who has become recognized and accepted by the public as a nationwide symbol of forest fire prevention.

Under authorization of the Act of May 23, 1952 (18 USC 711), the Secretary of Agriculture has issued rules and regulations governing the licensing program. These licenses specify payment of royalties (usually five percent) and set up certain controls for administering the program and collecting the

royalties including advance deposits to protect the Government's interest. Such collections, along with appropriated funds, are used to finance the Cooperative Forest Fire Prevention Campaign.

The licensing program provides about one-tenth of the total funds required for the Cooperative Forest Fire Prevention Program.

Examples of Recent Accomplishments

In 1965, both numbers of forest fires and area burned were down sharply from 1964, reversing the trend of the previous two years. Increased publicity is helping to bring more and more of the forest areas needing protection under responsible care.

In fiscal year 1964, receipts from the commercial support educational program reached \$53,586.19, highest in the past ten years. The fiscal year 1964 figure of approximately \$31,000.00 more nearly approaches the expected level until more attention can be given to extension of this productive program.

In a new venture, full-page Smokey Bear "advertisements" were offered to 4,000 business papers. More than 200 of these papers used the Smokey Bear advertisement, donating to the campaign space having an estimated commercial value of \$99,710.00.

New items include an aluminum coaster/ash tray embossed with Smokey Bear's head and a forest fire prevention message. Distribution and orders for these have passed the 500,000 mark.

General Motors created and printed a Smokey Bear fire prevention poster for display in all their dealer outlets during Fire Prevention Week.

State and Federal units purchased \$150,000 worth of Smokey Bear items for the 1965 campaign to supplement the \$90,000 worth printed for them from appropriated funds.

(o) Restoration of Forest Lands and Improvements

Appropriation, 1966 and base for 1967	\$100,000
Budget Estimate, 1967	<u>100,000</u>

PROJECT STATEMENT

Project	: 1965	: 1966	: Increase	: 1967
	: Estimate	: Estimate		: Estimate
Restoration of forest lands and improvements	:\$11,655	:\$118,443	:-\$18,443	:\$100,000
Unobligated balance, start of year ...	:-19,134	:-18,443	: 18,443	: - -
Unobligated balance, end of year	: 18,443	: - -	: - -	: - -
Total increased pay costs (P.L. 89-301):	(- -)	(745)	(7655)	(1,400)
Total available or estimate	: 10,964	: 100,000	: - -	: 100,000

Recoveries from cash bonds or forfeitures under surety bonds by permittees or timber purchasers, who fail to complete performance, are used to complete improvement, protection, or rehabilitation work on lands under Forest Service administration. Funds received as settlement of a claim are used for improvement, protection, or rehabilitation made necessary by the action which led to the cash settlement (Act of June 20, 1958, 16 USC 579c).

(p) Payment to Minnesota (Cook, Lake, and St. Louis Counties)
from the National Forests Fund

Appropriation, 1966 and base for 1967	\$140,619
Budget Estimate, 1967	<u>141,000</u>
Increase	<u><u>7381</u></u>

PROJECT STATEMENT

Project	:	:	1966	:	:	1967
	:	1965	:Estimate:	Increase:	Estimate:	
Payment to Minnesota from the National	:	:	:	:	:	
Forests Fund (total available or	:	:	:	:	:	
estimate)	:	\$137,763:	\$140,619:	7381	:	\$141,000
	:	:	:	:	:	

The Act of June 22, 1948, as amended (16 USC 577c-577h) provides that the Secretary of the Treasury, upon certification of the Secretary of Agriculture, shall pay to the State of Minnesota at the close of each fiscal year an amount equivalent to three-fourths of one percent of the fair appraised value of certain National Forest lands in the counties of Cook, Lake, and St. Louis situated within the Superior National Forest. The Act further provides that payment to the State shall be distributed to each of these counties in conformity with the fair appraised value of such National Forest lands in each county.

(q) Payments to Counties, National Grasslands

Appropriation, 1966 and base for 1967	\$462,500
Budget Estimate, 1967	<u>462,500</u>

PROJECT STATEMENT

Project	:	:	1966	:	:	1967
	:	1965	:Estimate:	Increase:	Estimate	
Payment to counties (total available or estimate)	:	:	:	:	:	:
	:	\$448,910	\$462,500	- -	\$462,500	:
	:	:	:	:	:	:

At the end of each calendar year, 25% of the revenues from the use of submarginal lands are paid to counties under the provisions of Title III of the Bankhead-Jones Farm Tenant Act, approved July 22, 1937 (7 USC 1012).

(r) Payments to School Funds, Arizona and New Mexico

Appropriation, 1966 and base for 1967	\$112,130
Budget Estimate, 1967	<u>115,000</u>
Increase (due to an estimated increase in National Forest receipts in fiscal year 1966)	<u><u>2,870</u></u>

PROJECT STATEMENT

Project	: 1965	: 1966	: Estimate	: Increase	: 1967	: Estimate
Payments to school funds (total available or estimate)	: \$108,205	: \$112,130	: \$2,870	: \$115,000		

Under provisions of the Act of June 20, 1910 (36 Stat. 562, 573) certain areas within National Forests were granted to the States for school purposes. The percentage that these lands are of the total National Forest area within the State is used in determining payments to the States. The receipts from all National Forest land within the State are used as the basis for applying the percentage. For example, if total receipts for the State are \$100,000 and if 10% of lands are in the "granted for school purposes" category, the payment to the State would be \$10,000. The amounts so paid are deducted from the net receipts before computing the 25% payments to States.

As soon after the close of the fiscal year as the receipts from National Forests and the area of school lands in the States of Arizona and New Mexico are determined, the payments are made to the States. Estimated payments in fiscal year 1966 to Arizona will be \$111,794 and to New Mexico \$336.

(s) Payments to States, National Forests Fund

Appropriation, 1966 and base for 1967	\$35,504,367
Budget Estimate, 1967	<u>36,800,000</u>
Increase (due to an estimated increase in National Forest receipts in fiscal year 1966)	<u><u>\$1,295,633</u></u>

PROJECT STATEMENT

Project	:	1965	:	1966 Estimate	:	Increase	:	1967 Estimate
Payments to States (total available or estimate)	:	\$32,837,416	:	\$35,504,367	:	\$1,295,633	:	\$36,800,000

The Act of May 23, 1908, as amended (16 USC 500) requires, with a few exceptions, that 25% of all money received from the National Forests during any fiscal year be paid to the States in which the forests are located, for the benefit of public schools and public roads of the county or counties in which such National Forests are situated. The amount of this appropriation varies each year in direct proportion to National Forest receipts during the previous fiscal year.

The amounts set aside from receipts collected for the sale of National Forest timber, grazing and special use permits, etc., before the 25% is applied are listed below:

1. Payment to the State of Minnesota covering certain National Forest lands in the Counties of Cook, Lake, and St. Louis situated within the Superior National Forest is made under the terms of the Act of June 22, 1948, Public Law 733. Receipts collected from the areas covered by this Act are excluded when the 25% payment to the State of Minnesota is computed.
2. For lands in certain counties in Utah, Nevada, and California, the States receive 25% of receipts only after funds, if made available by Congress, have been set aside for the acquisition of National Forest lands within the specified National Forests under the terms of special acts authorizing appropriations from forest receipts for this purpose.
3. Payments to the States of Arizona and New Mexico under the provisions of the Act of June 20, 1910, of shares of the gross receipts from the National Forests in those States are proportionate to the areas of land granted to the States for school purposes within the National Forests.

(t) Working Capital Fund, Forest Service

This fund finances on a reimbursable basis various services such as repairing and replacing equipment, including aircraft, stocking and issuing supplies, operation of subsistence camps, operation of sign shops, photographic and reproduction facilities, and tree nurseries in support of programs of the Forest Service (16 U. S. C. 579b, as amended). These service operations serve programs of fire protection, timber utilization, construction and maintenance of roads and other improvements, reforestation, grazing, watershed, forest and forest products research, and kindred conservation activities of the Forest Service, including cooperative assistance with other Federal agencies, States, counties, and individuals engaged in the same objectives.

Operating results and financial condition. Government investment in the fund as of June 30, 1965, including donated assets and retained earnings for fiscal year 1965, is \$34,730 thousand. By the end of 1967, the investment is anticipated to be \$41,247 thousand, an increase of \$6,517 thousand which represents estimated earnings and donations during 1966 and 1967.

Retained earnings as of June 30, 1967, will total an estimated \$9,900 thousand of which \$7,146 thousand will have been invested in additional equipment and increased cost of equipment replaced; \$1,458 thousand will be reserved for increased cost of equipment to be replaced and \$1,296 thousand will provide adequate working capital for operation of the fund.

(u) Cooperative Work, Forest Service (Trust Fund)

Contributions are received from cooperators, including counties, States, timber sale operators, individuals, and associations, and are expended by the Forest Service in accordance with the terms of the applicable cooperative agreements. The work consists of protection and improvement of the National Forests, work performed for National Forest users, and forest investigations and protection, reforestation, and administration of private forest lands.

The major programs conducted under the account "Cooperative Work, Forest Service" are described below in terms of the projects reflected in the statement at the end of this section.

1. Construction and Maintenance of Roads and Trails, and
2. Construction and Maintenance of Other Improvements:

Under the Acts of June 30, 1914 (16 U.S.C. 498) and March 3, 1925 and April 24, 1950 (16 U.S.C. 572) deposits for cooperative work are accepted from State and local government agencies, associations, Federal timber purchasers, and others for the construction and maintenance of roads, trails, and other improvements and for performing work which is the National Forest users' responsibility, this method of performance of the work being of mutual benefit or of benefit to the public at large. Cooperative deposits received for wildlife habitat improvement for States from their hunting and fishing fees are included in this activity.

3. Protection of National Forest and Adjacent Private Lands: The Act of June 30, 1914 (16 U.S.C. 498) authorizes the acceptance of deposits for the protection of the National Forests and the Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572), authorizes the acceptance of contributions for the protection of private lands in or near the National Forests. The major portion of the obligations is for the protection of private lands from fire. This arrangement helps both parties since there are millions of acres of private forest land intermingled with Federal ownership on the National Forests. The lands in private ownership are usually in small tracts. It would be uneconomical for the owner to set up a fire control organization for the protection of his land. The advantage to the Government is that in many cases it would be necessary to suppress the fires on the private land without reimbursement in order to protect the adjoining Federal land.
4. Sale Area Betterment (including reforestation): Section 3 of the Act of June 9, 1930 (16 U.S.C. 576b) provides for deposits of funds by timber sale purchasers to cover the cost of reforestation and special cultural measures to improve the future stand of timber on the areas cutover by the purchaser. Deposits in fiscal year 1964 under this authorization totaled \$19.9 million. Fiscal year 1964 accomplishments under this program are reported under the Forest Land Management sub-appropriation along with accomplishments for reforestation and stand improvement for that subappropriation.

5. Scaling: Under provisions of the Act of April 24, 1950 (16 U.S.C. 572) and of Section 210 of the Act of September 21, 1944 (16 U.S.C. 572a) acceptance of deposits from timber purchasers for cooperative scaling service is authorized. Such arrangements are established only when requested by the operator and when the operator pays the extra cost of such services.

Subsection (c), section 5, Act of April 24, 1950 (16 U.S.C. 572) provides broad authority to reimburse appropriations initially charged for expenses for cooperative services performed. The justification given in requesting this authority in the legislative history in House Report 1189 and Senate Report 1069, 81st Congress is limited to emergency situations. It would be convenient and economical to use this broad authority to furnish cooperative scaling services to timber purchasers by charging appropriations available for this type of work. Collections would be made later from the purchaser whenever he has arranged to pay for stumpage and other related charges after such charges have been determined. Comptroller General's Decision B-150466 dated January 14, 1963 clarified the authority in section 5 of the Act of April 24, 1950 (64 Stat. 82, 16 U.S.C. 572) to make collections in arrears for elective cooperative disopits related to timber sales applicable to payment bond procedures. In summary, the Comptroller General stated that he would have no legal objections to the Forest Service rendering services authorized by section 5 on a reimbursable basis in instances where: (1) it has been administratively determined to be advantageous to the Government, and (2) necessary precautions have been taken to insure the recovery of all costs involved. Including payment bond procedures; Provided: (1) deposits to appropriations do not exceed the amount of costs incurred, and (2) appropriate congressional committees be advised of our plans to use section 5c in situations other than the emergencies contemplated by the Congress at the time the law was enacted. Beginning in fiscal year 1964, the Forest Service used this procedure when appropriate.

6. Research Investigations: The Acts of June 30, 1914 (16 U.S.C. 498) and May 22, 1928 (16 U.S.C. 581i-1) authorize the acceptance of deposits for forestry research. Deposits are received from State and other public agencies, and from industrial, association, and other private agencies to finance research projects of mutual interest and benefit to both parties. The deposits may be made either in a single sum or on a continuing basis, and may either partially or wholly cover the cost of the research. The cooperative research projects may involve any aspect of forestry and vary widely as to scope and duration. A very common example of such cooperation is for a State to make a deposit to the cooperative work fund in order to intensify or to speed up completion of a comprehensive survey of the forest resources of the State. Other examples are State contributions toward forest fire research. The results of such cooperative investigations are made available to the general public as well as to the depositor.
7. Administration of Private Lands: The Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for the management of private lands. These contributions are made by private owners having land intermingled with or adjacent to National Forests who wish these lands managed in accordance with good forest management practices. Their holdings are usually too small to warrant the employment of professional foresters to administer such tracts. The advantages to the Government include the avoidance of possible high fire hazard areas resulting from improper cutting practices, the elimination of the

necessity of precisely marking the boundaries of the private land, and additional private forest land handled under proper forest practices.

8. Reforestation (private lands): The Act of March 3, 1925, as amended by Section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for reforestation of private lands situated within or near a National Forest. This work is limited to areas of private land within a planting project on the National Forests or to areas in which certain civic and other public-spirited organizations have taken an interest.
9. Statement on Utilization of Funds: Following is a statement of funds received and obligated and balances available by major activities:

COOPERATIVE WORK, FOREST SERVICE
Trust Fund

Project	Balance Available June 30, 1964	Actual Fiscal Year 1965			Estimate Fiscal Year 1966			Estimate Fiscal Year 1967		
		Funds Received	Obligations	Balance	Funds Received	Obligations	Balance	Funds Received	Obligations	Balance
1. Construction and maintenance of roads and trails	\$831,160	\$1,665,680	\$1,315,810	\$1,181,030	\$1,900,000	\$1,900,000	\$1,181,030	\$1,900,000	\$1,900,000	\$1,181,030
2. Construction and maintenance of other improvements a/	560,895	628,636	581,520	608,011	750,000	750,000	608,011	750,000	750,000	608,011
3. Protection on National Forests and adjacent private land:										
(a) Fire	521,162	1,990,626	1,978,786	533,002	2,025,000	2,025,000	533,002	2,025,000	2,025,000	533,002
(b) Other	1,423,265	1,332,161	1,466,093	1,289,333	1,500,000	1,500,000	1,289,333	1,500,000	1,500,000	1,289,333
4. Sale area betterment on National Forest lands (including reforestation)	28,184,836	20,726,759	16,810,722	32,100,873	21,000,000	20,000,000	33,100,873	22,000,000	21,000,000	34,100,873
5. Scaling of timber	267,179	846,673	875,009	238,843	835,000	835,000	238,843	835,000	835,000	238,843
6. Research investigations	284,259	831,225	836,493	278,991	900,000	900,000	278,991	900,000	900,000	278,991
7. Administration of private lands ..	9,775	11,196	11,501	9,470	5,000	5,000	9,470	5,000	5,000	9,470
8. Reforestation (private lands) ...	90,931	40,760	42,583	89,108	40,000	40,000	89,108	40,000	40,000	89,108
Total	32,173,462	28,073,716	23,918,517	36,328,661	28,955,000	27,955,000	37,328,661	29,955,000	28,955,000	38,328,661

a/ Includes approximately \$260,000 State hunting and fishing cooperative deposits.

b/ Includes \$1,048 reimbursed to appropriation.

NOTE: Balances carried forward are due primarily to necessity of deferring work for which funds are deposited until the most practicable time. For instance, funds for sale area betterment are received in advance of cutting, but work cannot be started until cutting operations are completed. The time lag sometimes extends for several years, depending on the amount of preparatory work required in the sale area, weather conditions, etc.

Above obligations for 1965 include:

(1) Transfers to National Forests Fund of earned sale area betterment deposits in excess of obligations for sale area betterment work	\$163,574
(2) Refunds to cooperators	151,862
	\$315,436

